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# CQ

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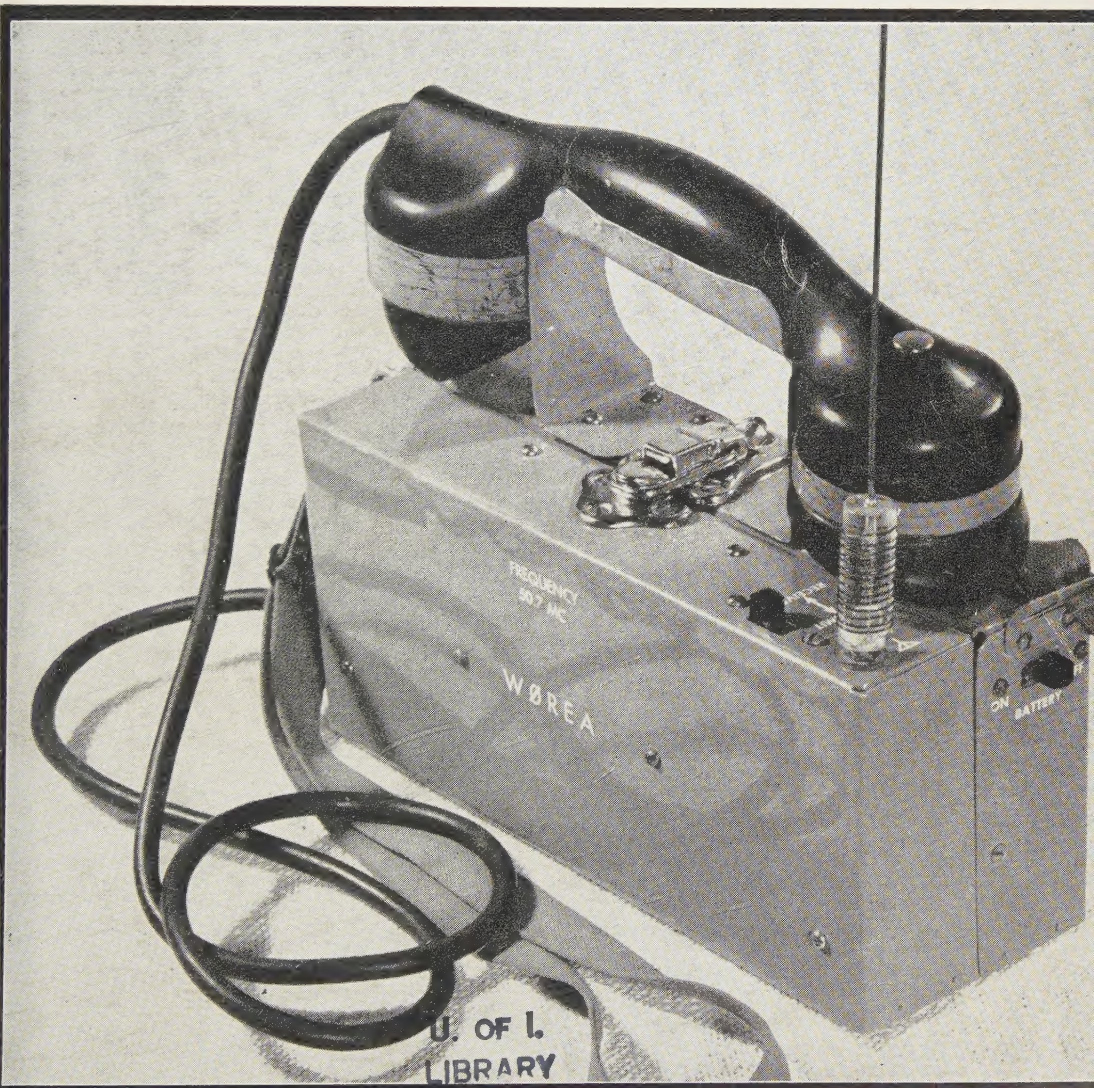
# RADIO AMATEURS' JOURNAL



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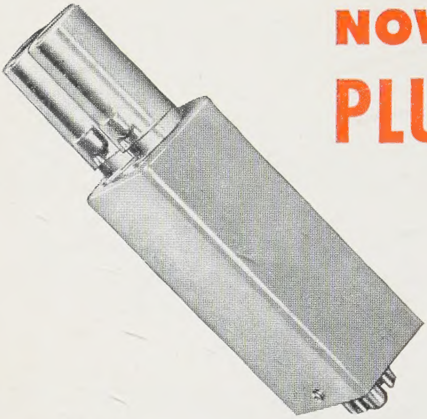
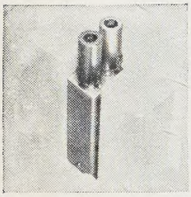
## In This Issue:

the "Q-Multiplier"
by Bill Scherer, W2AEF

Strap Set . . . Complete 25'er

# NOW . . .
# PLUG-IN selectivity for YOUR receiver

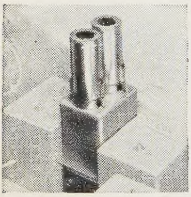




| Adapter Type | Bandwidth At -6 DB | Bandwidth At -60 DB |
|---|---|---|
| 353A-08 | 0.8 kc | 2.5 kc |
| 353A-12 | 1.2 kc | 3.0 kc |
| 353A-31 | 3.1 kc | 7.0 kc |
| 353A-60 | 6.0 kc | 12.6 kc |

**Net Each____$65.00**

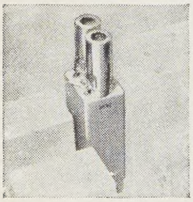
The 353A-series Adapter is shown in a Hammerlund SP-400. The 353A-series Adapter also fits the National HRO-60.



| Adapter Type | Bandwidth At -6 DB | Bandwidth At -60 DB |
|---|---|---|
| 353B-08 | 0.8 kc | 2.5 kc |
| 353B-12 | 1.2 kc | 3.0 kc |
| 353B-31 | 3.1 kc | 7.0 kc |
| 353B-60 | 6.0 kc | 12.6 kc |

**Net Each____$65.00**

The 353B-series Adapter between the IF cans in the SP-600-JX receiver.



| Adapter Type | Bandwidth At -6 DB | Bandwidth At -60 DB |
|---|---|---|
| 353D-08 | 0.8 kc | 2.5 kc |
| 353D-12 | 1.2 kc | 3.0 kc |
| 353D-31 | 3.1 kc | 7.0 kc |
| 353D-60 | 6.0 kc | 12.6 kc |

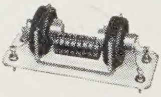
**Net Each____$65.00**

The 353D-series Adapter in the National HRO-50 or HRO-50T1.

Popularity of Collins Mechanical Filters and Mechanical Filter Adapters in the 75A Amateur Receivers has resulted in many requests for Mechanical Filter Adapters designed for use in other popular receivers.

The advantages of the mechanical filter approach to receiver selectivity may be immediately recognized. For instance, Filter Adapters eliminate problems normally associated with improving receiver selectivity. Installation requires only that an IF tube be removed and the Filter Adapter plugged into its socket. No modification or disfiguration is necessary. The Collins Mechanical Filter Adapter is self-contained, permanently tuned, and power and signal circuits are obtained from the tube socket. Gain of the Filter Adapter matches that of the IF tube replaced.

The convenient plug-in feature of the Filter Adapter provides a means for selecting a choice of bandwidth for reception of CW, AM, SSB or FSK. For example, the 800 cycle bandpass Adapter may be plugged in for CW reception; the 1.2 kc Adapter for either CW or FSK; the 3.1 kc Adapter for AM or SSB; and the 6.0 kc Adapter for AM.



## MECHANICAL FILTERS ALSO AVAILABLE

Amateurs desiring Filters for application to other equipments now have a choice of center frequencies at 500 kc, 455 kc, and 250 kc — and bandwidth characteristics to fulfill most operating needs. In the F455-series (455 kc), bandwidths are established at 0.8 kc, 1.2 kc, 3.1 kc, and 6.0 kc. The F500-series (500 kc) provides a bandwidth choice of 1.4 kc, 3.1 kc, and 6.0 kc. For SSB reception with a 250 kc IF, the 250Z-series provides 3.2 kc bandwidths. A 6.7 kc bandwidth is available in the F250A-67 for receivers with a 250 kc IF.

**F455-series __$35.00 F250Z-series (3.2 kc)__$60.00**
**F500-series __$35.00 F250A-67 (6.7 kc)___$45.00**

## FREE LITERATURE AT YOUR REQUEST

Booklets describing Mechanical Filters and Mechanical Filter Plug-In Adapters are available. Included are response curves, detailed theory of operation, circuit applications, and other informative data. See your local distributor or contact a Collins Sales Office.

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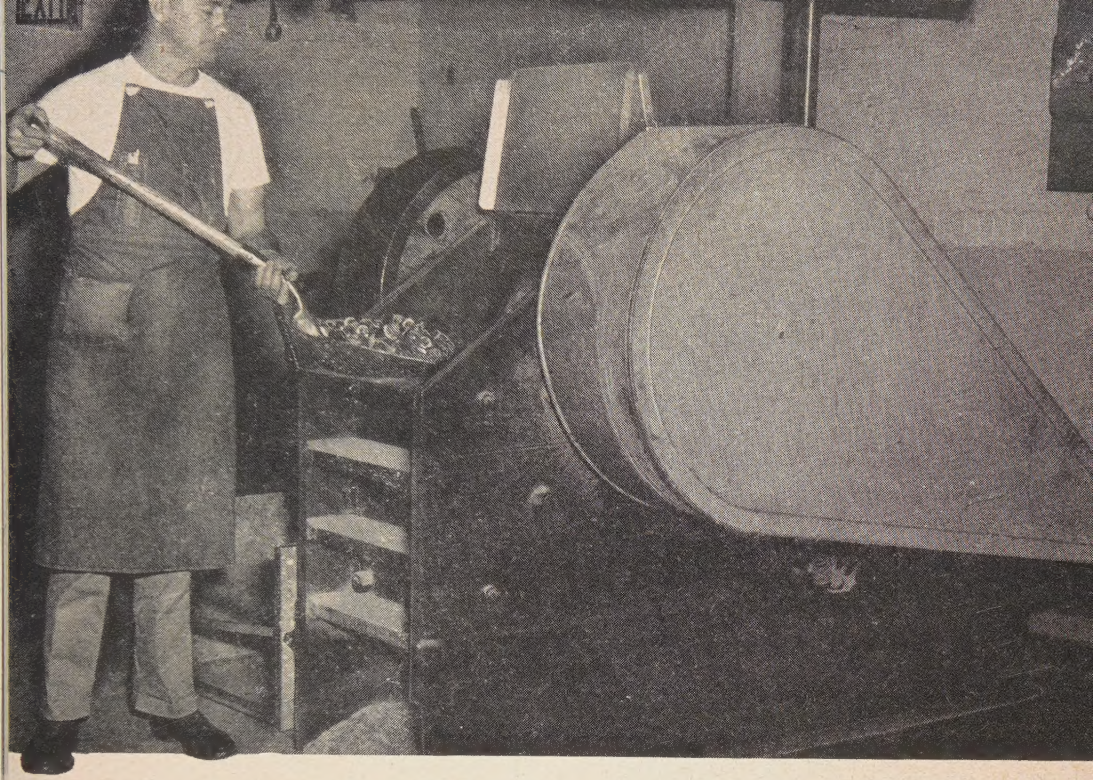

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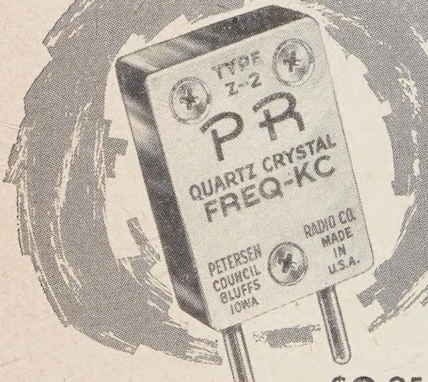

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January, 1955
Vol. 11, No. 1

**OUR COVER PHOTO**
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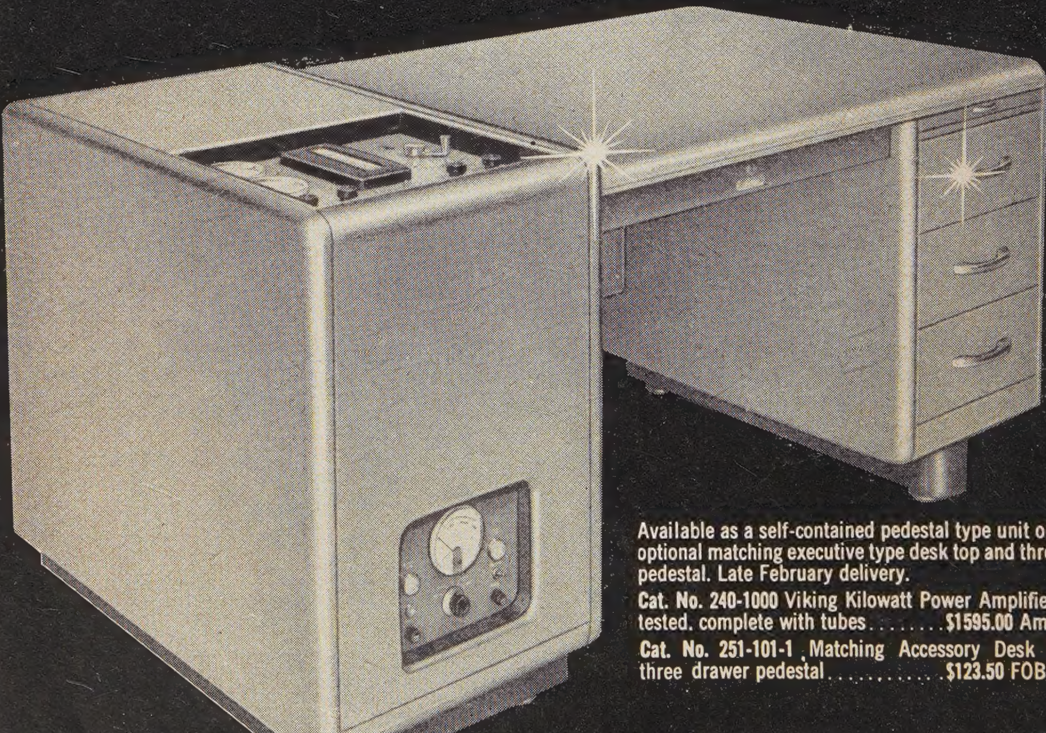
**POSTMASTER: SEND FORM 3579 to CQ,
67 WEST 44th ST., NEW YORK 36, N.Y.**

Tomorrow's Transmitte

Viking

KILOWATT



Available as a self-contained pedestal type unit or with
optional matching executive type desk top and three draw
pedestal. Late February delivery.

**Cat. No. 240-1000** Viking Kilowatt Power Amplifier—wir
tested. complete with tubes........$1595.00 Amateur

**Cat. No. 251-101-1** Matching Accessory Desk Top a
three drawer pedestal...........$123.50 FOB Cory,

E. F. JOHNSO

# · Today!

## OWER AMPLIFIER

1000 Watts Continuous Wave*
1000 Watts Amplitude Modulated Phone*
1000 Watts Single Sideband*

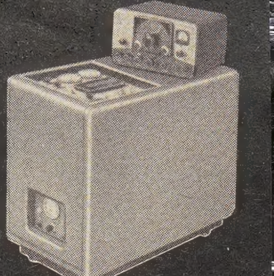
ximum power input allowed by FCC for amateur service

A magnificent new kilowatt . . . unequalled in performance . . .
luxurious in appearance! This boldly styled Viking Kilowatt is truly
tomorrow's concept of electronic equipment design and operating
nience. Of course you'd guess it's built by Johnson, unquestioned
leader in the amateur transmitter field.

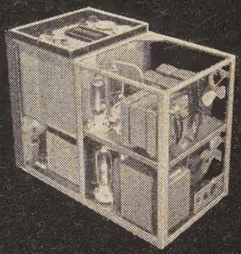
rating the Viking Kilowatt is a never-to-be forgotten experience . . .
you'll marvel at the ease of selecting SSB, AM, or CW with the flip
of a single switch . . . you'll enjoy the convenience of its desk top
s . . . and you'll immediately sense the authority of its full kilowatt
signal lifting you into a select group of leading amateurs . . .
ommanding the admiration of all. You'll be delighted, too, knowing
that all this can be yours at an unbelievably low price. This Viking
stands alone as a crowning achievement in all things that make a
perfectly engineered kilowatt a pleasure to own and operate.

For more than just a look at the functional exterior beauty of the
ing Kilowatt, a deluxe brochure with the complete inside story may
be yours on request. Write for your copy today.

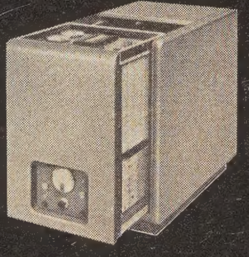
CONTINUOUS COVERAGE FROM 3.5 TO 30 MC. MAKES THE
VIKING KILOWATT AN IDEAL CHOICE FOR COMMERCIAL APPLICATIONS, TOO.



This compact pedestal contains the com
plete Viking Kilowatt. Excitation require
ments are 30 watts RF and 15 watts audi
for AM and 10 watts peak for SSB. Th
Viking "Ranger" transmitter/excite
(shown above) is an ideal RF and audi
driver for AM and CW, and the Nev
Viking SSB transmitter/exciter, soon t
be announced, will drive the Viking Kilo
watt to full output on SSB.



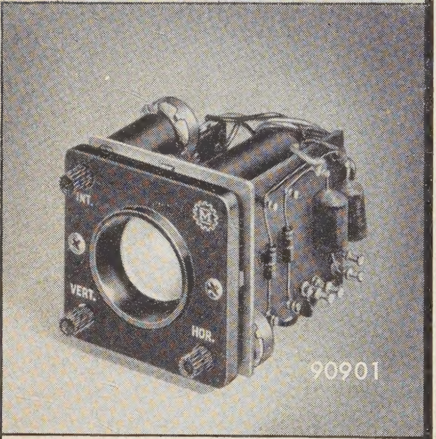
Interior view showing conservatively
rated power equipment, heavy duty
(PP810) modulator and push-pull venti-
lating fans. Shielded RF power amplifiers
are parallel connected 4-250A's. High volt-
age supply (872A's) delivers 2500 volts
at over 700 ma. Screen supply is VR tube
regulated.



The Viking Kilowatt is compact yet com-
pletely accessible. Containing RF power
amplifier, modulator, power supplies, and
all control equipment, the entire unit rolls
out of the pedestal on ball bearing rollers.
This provides complete accessibility to all
electrical components for adjustment or
maintenance.

MPANY • WASECA, MINNESOTA

Designed for
Application



**The No. 90901**
**One Inch**
**Instrumentation Oscilloscope**

Miniaturized, packaged panel mounting cathode ray oscilloscope designed for use in instrumentation in place of the conventional "pointer type" moving coil meters uses the 1″ 1CP1 tube. Panel bezel matches in size and type the standard 2″ square meters. Magnitude, phase displacement, wave shape, etc. are constantly visible on scope screen.

**JAMES MILLEN**
**MFG. CO., INC.**
MAIN OFFICE AND FACTORY
**MALDEN**
**MASSACHUSETTS**

# SCRATCHI

Feenix, Ariz.

Deer Hon. Ed:

Merry cristals and happy new geer—Hackensaki, Hon. Ed., but I are now tired of heering those words. Are also tired of listening to the Xmas carols. Not that Scratchi are trying to make like meen old man Screwge, but looking at yourself. How are you feeling on last cupple days of December? All your Xmas spearit is gone, you didn't get the Xmas presents you wanted, you still having to rite thank-you notes for same, and you are broke on acct. Spending all your bux buying presents for other peeples. And, to topping it all off, some smartbuddies wanting you to making set of New Yeer's resolushuns for next yeer. Hah! And there you are.

By gollies, I not nocking Xmas, and I looking forward to Xmas next yeer, but one resolushun I making forthwith are that I being more exactly in telling peeple what I wanting for Xmas. You gotta making calls if you wanting to get results sort of stuff. Not that Scratchi are not trying hard enuf this time.

I carefully making list, figuring out what each ant, uncle, relative and friend are able to giving. Next I riting them each nice letter, asking how are they, and haven't we been having nice wether, then I hinting reel slicky-like that I wanting sumthing for ham shack for Xmas present.

Are also having sum well-heeled relatives, and here Scratchi taking differunt approach. Here I enclosing sum clipping on sum piece of ham geer, and remarking how nice it looking in Hon. Ham Shack. Always cutting out enuf of ad so price not showing, but leeving in place to ordering from.

Despite all these elaborate precawshuns and Scratchi's well-planned attack, I are getting nothing but youshewal tipe Xmas presents. Well, reely can't saying that. Are ackchewally getting sum rather unyoushewall presents. Like taking for examples pencil box with eleventeen pencils in, each with name on in gold (spelled Fashahisti Scratchi). Or for instances another present I getting—one sample lesson on how to being 1/c radio serviceman. Scratchi being very confused with these presents, and not getting answer until checking clippings I sending out.

*(Continued on page 8)*

# NEW

# New Year's News from

Model SX-96 SELECTABLE SIDEBAND RECEIVER

# hallicrafters

Chicago 24, Illinois

anada:
HALLICRAFTERS COMPANY · Don Mills Road · Box 27, Station R · Toronto 17, Ontario, Canada

## HALLICRAFTERS

- Covers Broadcast 538-1580 kc plus three S/W 1720 kc—34 Mc.
- Precision gear drive dial system.
- Double conversion with selectable crystal controlled second oscillators
- Selectable side band reception of both suppressed carrier and full carrier transmissions.
- Highly selective 50 kc I. F. system.
- CW operation with AVC on.
- Delayed AVC.
- Calibrated bandspread—"S" meter—double superhet.
- 10 tubes, 1 rectifier and voltage regulator.

Heathkit
GRID DIP METER KIT

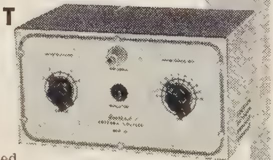
The invaluable instrument for all Hams. Numerous applications such as pretuning, neutralization, locating parasitics, correcting TVI, adjusting antennas, design procedures, etc. Receiver applications include measuring C, L and Q of components—determining RF circuit resonant frequencies.

Covers 80, 40, 20, 11, 10, 6, 2, and 1¼ meter Ham bands. Complete frequency coverage from 2—250 Mc, using ready-wound plug-in coils provided with the kit. Accessory coil kit, Part 341-A at $3.00 extends low frequency range to 350 Kc. Dial correlation curves furnished.

Compact construction, one hand operation, AC transformer operated, variable sensitivity control, thumb wheel drive, and direct reading calibrations. Precalibrated dial with additional blank dials for individual calibration. You'll like the ready convenience and smart appearance of this kit with its baked enamel panel and crackle finish cabinet.

MODEL GD-1B
$19.50 Ship. Wt. 4 lbs.

Heathkit
ANTENNA COUPLER
KIT



The new Heathkit Antenna Coupler Model AC-1 was specifically designed to operate with the Heathkit Amateur Transmitter and will operate with any transmitter not exceeding 75 watts RF input power. Rugged design has resulted in a sturdy, well shielded unit featuring a copper plated chassis and shield compartment. Coaxial 52 ohm receptacle on the rear of the chassis connects to a three section Pi- type low pass filter with a cut-off frequency of 36 Mc. Tuning network consists of a variable capacitance and tapped inductance in an impedance matching unit. Capacity coupled neon lamp serves as a tuning indicator and will also provide a rough indication of power output.

MODEL AC-1
$14.50 Ship. Wt. 4 lbs.

Heathkit IMPEDANCE METER KIT

The Heathkit Antenna Impedance Meter is basically a resistance type standing wave ratio bridge, with one arm a variable resistance. In this manner it is possible to measure radiation resistance and resonant frequency and antenna transmission line impedance; approximate SWR and optimum receiver input. Use it also as a monitor or as a field strength meter where high sensitivity is not required. Frequency range of the AM-1 is 0–150 Mc and range of impedance measurements 0–600 ohms. The circuit uses a 100 microampere Simpson meter as a sensitive null indicator. Shielded aluminum light weight cabinet. Strong self supporting antenna terminals.

MODEL AM-1
$14.50 Ship. Wt. 2 lbs.

HEATH COMPANY
BENTON HARBOR 6, MICHIGAN

## Scratchi

*(from page 6)*

As you knowing, Hon. Ed., are to sides to each clipping. You gessing it. Pencil box being advertised on backside from slicky VFO, and sample lesson on how to being 1/c serviceman on backside from snazzy mobile antenna I needing. How can peeples being so careless!!

Sum peeple that I not sending any clippings to are sending me radio things, all rite. Like taking nice brand new tipe 24A toob. Or pair earfones that so old they looking like they war surplus from Spanish-American war of 1812.

Now, Hon. Ed., plees don't misunderstanding, Everybuddy who sending me presents are reely trying to pleesing me, and I reely apprishiateing it. And, lots of peeples doing ok by Scratchi. Getting six hankercheeves from old ant, who also enclosing five bux hard cash. Granduncle old feller sending big jug cacktus jooce (that I needing like pink slip from FCC) and finding check for ten bux attached to jug. In fackly, getting monies from lots and lots of peeples.

Maybe Scratchi are just in doldrums from trying to rite thank-you letters. How wud you thanking Hon. Paternal Grandfather for dusty old tipe 19 toob? Or maternal ant on mother's side for five pounds of sodder (bar tipe, five bars, one pound each)? Riting letters like these are abouts as easy a picking up VK's on cristal set.

No, Hon. Ed., more I thinking about things, the more I thinking I better be giving up amchoo radio. I getting stale. I could be stamp-collector There must be lots of nice stamps around showing pickshures of radio towers, or radio stations. . . Sacramento!! there I go with amchoor radio. No, could taking up mounten climeing. Ah, the thrill of being thousands of feet high, the world spred before you, what a spot for Hon. Two-Meter Antenna . . . oops, there I going again.

How abouts deep-see fishing. Out on blue pacific trolling line out, see-breeze in face, fishing for dolfin with 1000 yards of copper wire as line. Boy wouldn't that making neet long-wire antenna! OOPS! Hon. Ed., I guessing it no use. Scratchi are bitten permanently with amchoor bug. So, present or no, I'll still be amchoor. Now, let's counting the monies I getting for Xmas. . . . five, six, seven twelve, seventeen. . . . thirty-three, thirty-ate Thirty-ate bux! Hey, not so bad. I knowing slick VFO I can getting for that from amchoor friend Things turned out hokey-dokey.

Excoosing me, Hon. Ed., are rushing out to seeing this fellers with VFO before he selling it. Oh before I forgetting, having Happy New Yeer yourself.

Respectively your

Hashafisti Scratch

# New Heathkit VFO KIT

**MODEL VF-1**

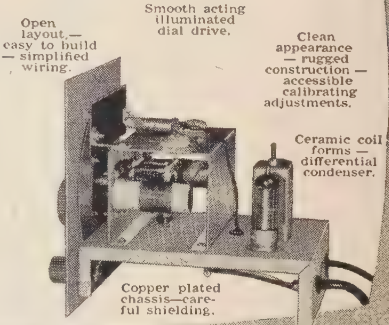
**$19.50**

**Ship. Wt. 7 lbs.**

- Smooth acting illuminated and precalibrated dial.
- 6AU6 electron coupled Clapp oscillator and OA2 voltage regulator.
- 7 Band coverage, 160 through 10 meters—10 Volt RF output.
- Copper plated chassis—aluminum cabinet—easy to build—direct keying.

Here is the new Heathkit VFO you have been waiting for. The perfect companion to the Heathkit Model AT-1 Transmitter It has sufficient output to drive any multi-stage transmitter of modern design. A terrific combination of outstanding features at a low kit price. Good mechanical and electrical design insures operating stability Coils are wound on heavy duty ceramic forms, using Litz or double cellulose wire coated with polystyrene cement. Variable capacitor is of differential type construction, especially designed for maximum bandspread and features ceramic insulation and double bearings.

This kit is furnished with a carefully precalibrated dial which provides well over two feet of calibrated dial scale. Smooth acting vernier reduction drive insures easy tuning and zero beating. Power requirements 6.3 volts AC at .45 amperes and 250 volts DC at 15 mills. Just plug it into the power receptacle provided on the rear of the AT-1 Transmitter Kit. The VFO coaxial output cable terminates in plastic plug to fit standard ½" crystal holder. Construction is simple and wiring is easy.


Open layout,—easy to build — simplified wiring.
Smooth acting illuminated dial drive.
Clean appearance — rugged construction — accessible calibrating adjustments.
Ceramic coil forms — differential condenser.
Copper plated chassis—careful shielding.

# Heathkit AMATEUR TRANSMITTER KIT

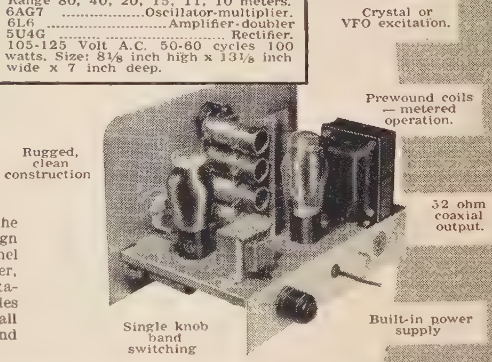
**MODEL AT-1**

**$29.50**

**Ship. Wt. 16 lbs.**

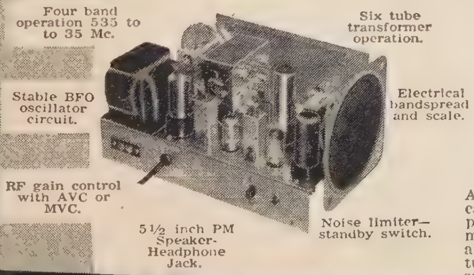
**SPECIFICATIONS:**

Range 80, 40, 20, 15, 11, 10 meters.
6AG7 ....................Oscillator-multiplier.
6L6 ..........................Amplifier-doubler
5U4G ............................................ Rectifier.
105-125 Volt A.C. 50-60 cycles 100 watts. Size: 8⅛ inch high x 13⅛ inch wide x 7 inch deep.


Crystal or VFO excitation.
Prewound coils — metered operation.
Rugged, clean construction
52 ohm coaxial output.
Single knob band switching
Built-in power supply

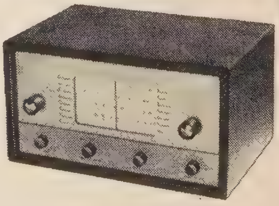
Here is a major Heathkit addition to the Ham radio field, the AT-1 Transmitter Kit, incorporating many desirable design features at the lowest possible dollar-per-watts price. Panel mounted crystal socket, stand-by switch, key click filter, A. C. line filtering, good shielding, etc. VFO or crystal excitation—up to 35 watts input. Built-in power supply provides 425 volts at 100 MA. Amazingly low kit price includes all circuit components, tubes, cabinet, punched chassis, and detailed construction manual.

# NEW Heathkit COMMUNICATIONS RECEIVER KIT


Four band operation 535 to to 35 Mc.
Six tube transformer operation.
Stable BFO oscillator circuit.
Electrical bandspread and scale.
RF gain control with AVC or MVC.
5½ inch PM Speaker-Headphone Jack.
Noise limiter—standby switch.

**SPECIFICATIONS:**

Range..........535 Kc to 35 Mc
12BE6 ...........Mixer-oscillator
12BA6 .............I. F. Amplifier
12AV6 Detector—AVC—audio
12BA6 ....B. F. O. oscillator
12A6 ......Beam power output
5Y3GT ......................Rectifier
105-125 volts A.C. 50-60 cycles, 45 watts.



A new Heathkit AR-2 communications receiver. The ideal companion piece for the AT-1 Transmitter. Electrical bandspread scale for tuning and logging convenience. High gain miniature tubes and IF transformers for high sensitivity and good signal to noise ratio. Construct your own Communications Receiver at a very substantial saving. Supplied with all tubes, punched and formed sheet metal parts, speaker, circuit components, and detailed step-by-step construction manual.

**MODEL AR-2**

**$25.50**

**Ship. Wt. 12 lbs.**

**CABINET:**

Proxylin impregnated fabric covered plywood cabinet. Shipg. weight 5 lbs. Number 91-10, $4.50.

## HEATH COMPANY
**BENTON HARBOR 6, MICHIGAN**

# For SSB take your pick from the Eimac Big Six

**EIMAC BIG SIX**
Radial-Beam Power Tubes

| Tube type | Ham bands thru: |
|---|---|
| 4-65A | 144mc |
| 4-125A | 144mc |
| 4-250A | 144mc |
| 4-400A | 144mc |
| 4X150A | 420mc |
| 4E27A | 144mc |

EIMAC Big Six radial-beam power tubes with high screen voltage ratings, high power gain, and time proved performance in class $AB_1$ and $AB_2$ service are ideal for Single Sideband operation. The inherent high power gain of Eimac radial-beam power tubes is a natural to put a strong signal on the air despite the low level modulator and driver of SSB. Take advantage of the power saving and reduced interference of SSB operating with the quality, reliability and performance of Eimac Big Six tubes — proved in all types of commercial, military and amateur application. When planning or building that SSB rig, consider the more watt-hours per dollar offered by Eimac — the mark of excellence in electron-power tubes for 20 years.

*For further information contact our Amateurs' Service Bureau.*

Eimac

**EITEL-McCULLOUGH, INC.** SAN BRUNO CALIFORNIA
The World's Largest Manufacturer of Transmitting Tubes.

# Q multiplier

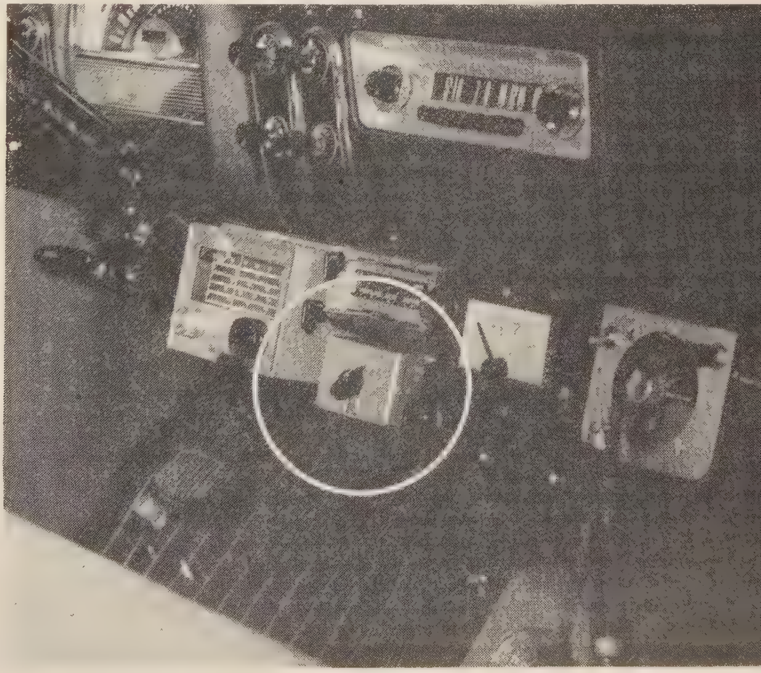
**Wilfred M. Scherer, W2AEF**

Contributing Editor

The fundamentals of the "Q Multiplier" have been described by Villard[1], who developed it for the applications described herein, and its use was also shown in CQ[2]. As often happens with many excellent devices, its full potentialities and its extreme usefulness has not been brought to the attention of the amateur, nor has data been made available on a complete operating unit made of easily procured components. It was with these views in mind, that the models described below were developed.

The *Q Multiplier* functions as a tunable electronic filter by which high degrees of selectivity, for either peaking or rejecting a signal, may be obtained in a receiver i-f amplifier. It may also be used as a b.f.o., or used to provide an "exalted" carrier.

The unit is built in outboard fashion for use with any communications receiver or with any mobile receiving setup. Its installation may be made without any alterations to, or realignment of, the existing receiver. The only r-f connection is made at one terminal of the first i-f transformer. Heater and plate power is also obtained from the receiver, the requirements being 6.3 volts at 0.3 amperes and 150 to 300 volts at 5 milliamperes. A selector switch provides a choice of "Off," "Peak," "Null" (reject) or "B.F.O." The circuit diagram is shown in *Fig. 1*.



**The "Q-Multiplier" is particularly advantageous in a mobile installation. When used with the average auto receiver it makes a tremendous improvement in controllable selectivity It may also be used for mobile CW reception and, as explained in the text, for SSB work.**

---

[1] Villard and Rorden, "Flexible Selectivity for Communications Receivers," **ELECTRONICS**, April, 1952, p. 138.

[2] Champlin, "Flexible I-F Channel Selectivity," **CQ**, October, 1953, p. 31.

## Theory

When it is used to peak a signal, the *Q Multiplier* may be considered, basically, as an exceptionally high *Q* parallel resonant circuit connected across the i-f transformer. At the resonant frequency the impedance is high, and a signal at the frequency of resonance will pass unhindered. At other frequencies the impedance is lower, and therefore signals at these frequencies are attenuated by an amount which depends on the *Q* of the circuit and on the frequency deviation from resonance.

*Q* multiplication is obtained by positive feedback through *V1*, and this will increase the circuit *Q* by a factor of from 20 to 40. Since the circuit *Q*, with the components used in the units described here, is in the order of 200, it may be seen that a total *Q* may be obtained which is comparable to that of a crystal filter—the equivalent *Q* of which is approximately 4000.

The resonant frequency of the positive feedback circuit may be varied by *C3*, and the unit peaked within the normal passband of the receiver. This feature offers an advantage over the usual type of crystal filter in that it results in much easier tuning. All that is necessary is that the receiver be tuned reasonably near the incoming signal frequency and exact peaking by tuning the *Q Multiplier*. When several received signals are close together in frequency, any single one may be "peaked" with the *Q Multiplier* tuning control without requiring any retuning of the receiver itself.

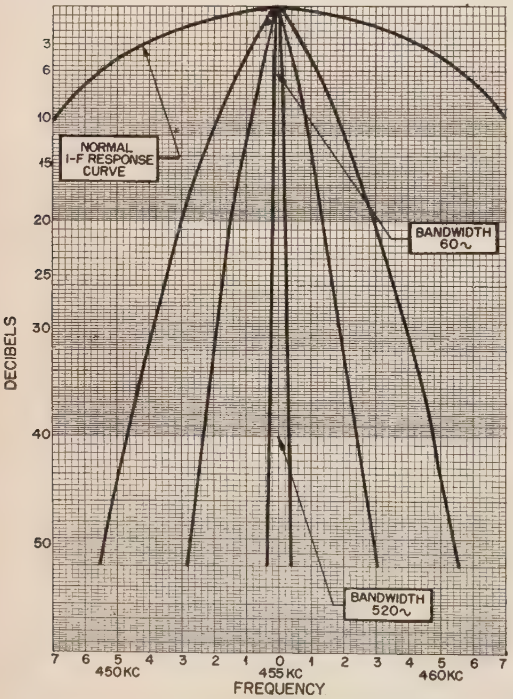


**Fig. 2. Peaking positions of the "Q-Multiplier." The curves represent different settings of R7. This graph does not show gain, but only db. down of the passband. The peak is moved back and forth throughout the range of 450 to 460 kc. by tuning C3.**

When the receiver b.f.o. is used for CW or SSB reception, the beat note will remain constant while the tuning is done by *C3*, since this does not alter the beat between the receiver's h-f oscillator and the incoming signal. Thus the possibility of losing a signal, or misidentifying it, is at a minimum. This is of special advantage for SSB work, because it will permit peaking of either an upper or lower sideband without a change being required in the b.f.o. setting. Due to the high selectivity of the system, the undesired sideband may be attenuated.

*R7* controls the amount of feedback, and thus the *Q* multiplication factor may be changed to obtain various degrees of selectivity below the maximum. As the selectivity of an i-f filter is increased the high frequency audio response of phone signals will drop. Too high a degree of selectivity may result in poor intelligibility. The controllable variation of selectivity, or bandwidth, is therefore a convenient means for obtaining optimum selectivity consistent with readability for either phone or CW signals.

When *R7* is set for maximum selectivity, the signal level will be peaked up several db. over that realized when the *Q Multiplier* is not in the circuit. This is unlike the crystal filter, where the level often drops when the crystal is inserted. On the other hand, as the *Q Multiplier* selectivity is decreased, the signal level will drop off just below the normal receiver level.

When CW reception is involved, the increase of level at maximum peaking of the signal may be discerned by ear, but with phone reception the increase of level may be detected only by the S-meter, because the high frequency audio response drops off as the selectivity is increased, and the net effect to the ear is a drop in volume. This is characteristic of any highly selective circuit.

*Figure 2* shows curves of the selectivity obtainable at various settings of the "selectivity" control. These curves are the result of measurements made on a receiver having only one i-f stage using miniature slug tuned i-f transformers. This receiver was employed to better indicate the vast improvement in selectivity which is obtainable using the *Q Multiplier* with a fairly non-selective receiver. This should be of special interest to those engaged in mobile operation.

## Signal Rejection

When the *Q Multiplier* unit is used to reject a signal, it may be considered a series resonant circuit connected across the i-f transformer. At the resonant frequency the impedance is low (it approaches a short circuit), while at frequencies off resonance, the impedance increases and permits less attenuation to occur at those frequencies, by an amount which is dependent on the circuit *Q* and the frequency deviation from resonance.

For this purpose the *Q Multiplier* unit functions by negative feedback through *V2*, which is controlled by *V1*, and as with the peaking circuit, it is tunable over the normal passband of the receiver.

A null, or a notch, of at least 50 db. may now be obtained at any desired point in the receiver pass-

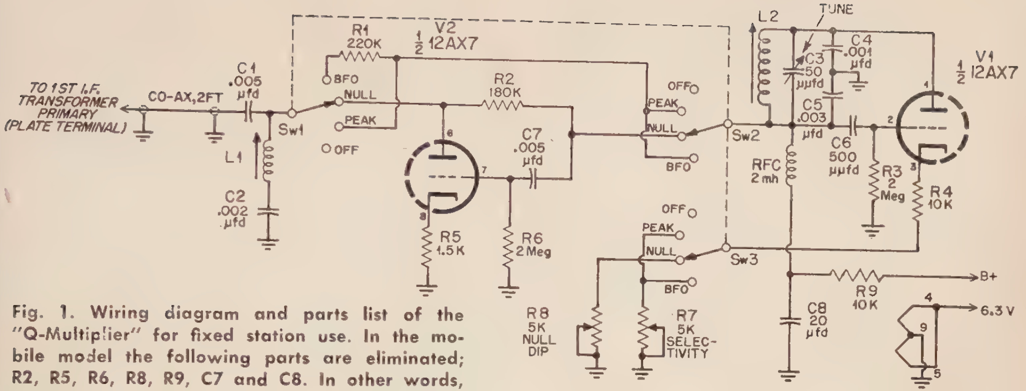


**Fig. 1. Wiring diagram and parts list of the "Q-Multiplier" for fixed station use. In the mobile model the following parts are eliminated; R2, R5, R6, R8, R9, C7 and C8. In other words, all circuitry associated with V2. Constructors may find that slight variations in the capacity of C5 will be quite important. Models have been constructed that use 0.0027 μfd. for smooth operation.**

C1, C7—0.005 μfd., disc ceramic.
C2—0.002 μfd., disc ceramic.
C3—50 μμfd., (National P5E50 or Millen 20050).
C4 -0.001 μfd., mica.
C5—0.003 μfd., mica.
C6 -500 μμfd., disc or mica.
C8—20 μfd., 450v., electrolytic (see text).
L1 — Grayburne Vari-choke V-6, or part of miniature 455-kc. i-f transformer (see text).
L2 — Grayburne Vari-Loopstick.
R1—220,000 ohms, ½w.
R2—180,000 ohms, ½w.
R3, R6 — 2.0 megohm, ½w.
R4—10,000 ohms, ½w.
R5—1500 ohms, ½w.
R7, R8—5000 ohms, carbon potentiometer.
R9 —10,000 ohms, 1w.
RFC—2.5 mh., r-f choke, stand-off type (Millen 34102 or National R100S).
Sw1/Sw2/Sw3—Single 3-pole, 4-throw rotary, non-shorting (Mallory 3234J).

band, while the otherwise normal characteristics of the amplifier will be unaffected. Used in this manner, the *Q Multiplier* functions like the crystal filter phasing control for the rejection of unwanted adjacent signals, but has the advantage of being more flexible. C-w QRM may thereby be reduced, and unwanted sidebands, beat notes and heterodynes may be attentuated for AM or SSB reception.

Curves of the rejection characteristics are shown in *Fig. 3*. Here again, the measurements were made using the receiver with normally poor selectivity where the null characteristics show up at their worst. With a sharper i-f system the rejection slot will be sharper and more effective.

### Bfo and Exalted Carrier Reception

In the "BFO" position, the *Q Multiplier* is permitted to oscillate, and thus a beat note at the intermediate frequency may be obtained. This feature is an attraction to the mobile operator who often will find a need for a b.f.o. to use in conjunction with the converter-auto radio combination.

The "BFO" position will also make exalted-carrier reception possible and clean SSB reception will result regardless of the setting of the receiver r-f gain control.

### Construction

The location of the various components may be seen in the photographs. The larger unit, for fixed station use, is built in a box 3"x4"x5" (*Bud Minibox CU-2105*), while the smaller unit, for mobile use, is built in a 2¼"x2¼"x5" box (*Bud Minibox CU-2104*).

Wiring in general should be made with reasonably short leads, and many of the components may be connected directly from point to point. The only critical connection is the cathode end of *R4* which must be made directly at the socket terminal. A long lead between the socket and the resistor can result in erratic operation.

To preserve its high *Q*, *L2* must be mounted so that other metal components, or the sides of the box, are at least 1" away from the coil and its ferrite core. Ferrous metals will have an especially adverse effect on the coil *Q*. These effects are easily double checked with a *Heathkit Q Meter Model QM-1.**

With optimum external conditions, it was found that the *Q* of *L2* averaged 250. Our first measurements had indicated a *Q* of only about 210 which was lower than expected. Upon investigation, it was found that the *Q* was influenced by the proximity to the ferrite core of the plated steel clips which were used to connect the coil to the *Q* meter. Copper wire leads were then soldered to the coil terminals, with higher *Q* readings being the result. On one of the coils, the sleeve which supported the terminals was loose. This was pushed forward so that the steel plated terminals passed over a portion of the core. The *Q* immediately dropped to 160! Further measurements made with the coil mounted in the *Q Multiplier* box indicated the best location for the preservation of high *Q*.

In the mobile model, the box is not quite deep enough for good clearance around *L2*, so it is necessary to shorten *L2* by ¼". Cut the required amount off the form after the mounting bracket and slug bearing sleeve have been removed. The latter may be replaced after the form has been cut. The *Q* of *L2* in the mobile model will be slightly lower than that in the large model, but will still be sufficient for excellent selectivity characteristics.

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* The author would like to thank the Heath Company for supplying the Q-meter used in developing these units.

Good grade mica capacitors are used for *C4* and *C5*, both to preserve good circuit *Q*, and to obtain stability. Silver mica capacitors, although not found necessary in the models, would be best.

*L1* is used to tune out the reactance of the co-ax cable which is presented to the i-f transformer winding to which the *Q Multiplier* is connected. In the larger model, *L1* is a *Grayburne Vari-Choke* #*V6*, 0.65 to 6.0 mh. This may be seen hanging below the center deck. The *Q* of this coil is quite low, and although satisfactory performance will result, somewhat better results may be obtained using a coil of higher *Q*. One such coil is used in the mobile model for *L1*, and it is in the i-f can shown above deck. This is a 455-kc. miniature slug-tuned i-f transformer with its two windings connected in series. The internal fixed padders must be disconnected. If it is more convenient, only one terminal on each padder may be disconnected. When the windings are connected, the outside of one winding must be connected to the inside of the other one.

*L1* and *C2* may be omitted, and compensation for the cable reactance may be made by retuning the receiver i-f transformer. This, of course, will defeat the original intent of leaving the receiver intact, but at the same time will lower the cost, and it may be more convenient in the event that the procurement of *L1* should be difficult. For new receiver construction, or for inboard installation, the omission of *L1* and *C2* may be preferable.

For smoother operation, *C3* is connected between the plate and grid sides of *L2*. Its rotor should be connected to the grid end to minimize hand capacitance effects. A large knob should be used for the same reason.

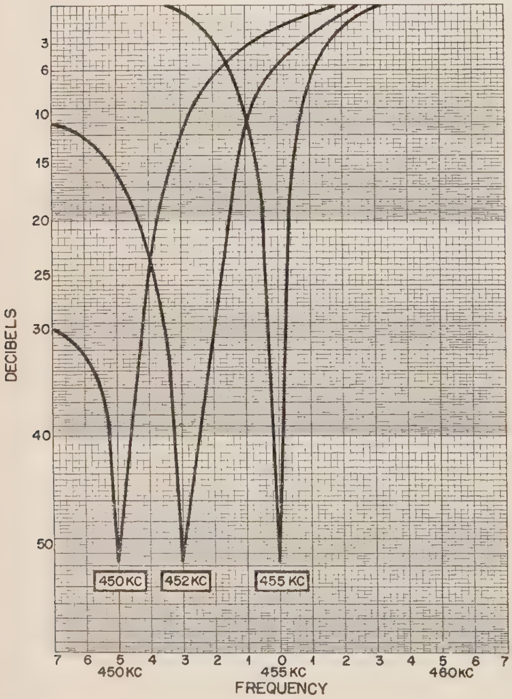


**Fig. 3. These are the "Q-Multiplier" null positions with the same i-f response as in Fig. 2. The notch is moved throughout the passband by varying C3.**

Only three switch positions are used in the mobile model. These are *Off*, *Peak* and *BFO*. The *Null* position has been eliminated, because this position would seldom be used for mobile work. The variable tuning capacitor *C3* has also been omitted to save space, and it, too, would seldom be required for mobile operation. The *Q Multiplier* circuit is tuned with the *L2* slug only, which is permanently set at the center of the i-f passband.

The other components, not needed for the null position, are also omitted in the mobile model: *R2*, *R5*, *R6*, *R8*, *C7* and the second half of the *12AX7* (*V2*). The *R/C* filter, *R9-C8*, is not included in the models shown here. This will be discussed later in the text.

## Installation and Operation

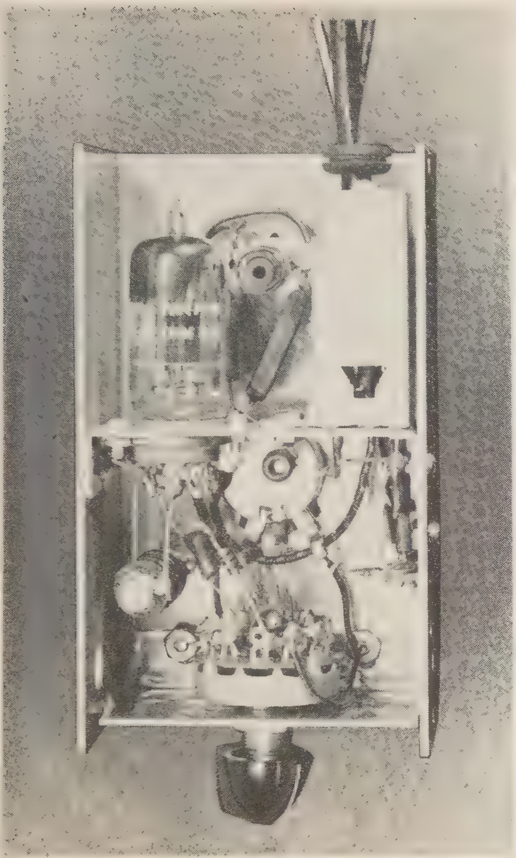
Heater and plate power connections should be made to the receiver. Any plate potential between 150 and 300 volts may be used, but potentials lower than 200 volts may require a reduction in the size of *R4*. Regulated plate potential, although desirable for the utmost in stability, is not essential in most cases.

The r-f co-ax lead may be connected across any winding of any of the i-f transformers. It is usually best to make the installation at the first i-f transformer—preferably the primary—because insertion of the selective circuit at the front end of the i-f chain will reduce the possibility of overloading the following stages by strong adjacent signals, and their effect on the a-v-c system will also be diminished. In making the cable connections, connect the center conductor to the hot side of the transformer winding, in this case the plate terminal, and connect the shield of the cable to ground.

After the unit has been connected to the receiver, set the *Q Multiplier* switch at *Off*, and turn on the power. Tune in a signal having a steady carrier, and peak up the signal according to the S-Meter reading. If the receiver does not have an S-Meter, the signal will have to be modulated, and the peaking may be done by ear.

Next tune *L1* to further peak up the signal. When *L1* has been tuned correctly, the signal level should show no appreciable change when the co-ax cable is disconnected from, or connected to, the i-f transformer. If *L1* does not peak the signal, and if the signal level drops when the cable is connected, more or less capacitance will be required to make *L1* tune. This may be done either by lengthening or shortening the cable according to which direction the *L1* slug must be moved to show any change in signal level. If the level tends to rise as the slug is turned out, less capacitance and a shorter cable will be required, and vice-versa.

After the circuits have been peaked as described above, rotate the *Q Multiplier* switch to *Peak*, and set the selectivity control *R7* at minimum (maximum resistance). In all probability the signal level will drop. Now, with *C3* set at half capacitance (the center point), adjust the slug in *L2* until the



**Under chassis view of the mobile model of the "Q-Multiplier." In these units the tuning condenser, C3, has been removed, as well as, the components associated with the nulling portion of the circuit.**

signal is again peaked. Then slowly advance the *Selectivity* control towards minimum resistance, and at the same time continue to check the peaking of *L2*. The peaking will become sharper, and the signal level will rise slightly as the control is advanced. A point will be reached at which the circuit will break into oscillation. This will be evidenced by an audible beat note, or howl, as *L2* is tuned back and forth, and it will also be noted by a sudden increase in the *S*-meter reading with no change occurring in the meter reading as *L2* is tuned. The *Selectivity* control should then be turned back to just below the point of oscillation. This will be the sharpest, or maximum, point of selectivity.

When the unit is tuned and set for maximum selectivity, rotate *C3* back and forth and note whether or not the unit tends to oscillate at either side of the center frequency to which it was originally peaked. Operation of the unit should be smooth without oscillation at either side of the center frequency. If a slight tendency towards oscillation is found at one side of center resonance, it may be corrected, for all practical purposes, by backing off slightly on the *Selectivity* control.

The ratio of capacitance between *C4* and *C5* controls the smoothness of tuning as *C3* is varied. Although variable padders may be used across these capacitors to realize the optimum ratio, the fixed values used in the models were found to be close enough for good operation.

Now tune in a phone signal while the *Q Multiplier* is set for *Peak*, near maximum selectivity and with *C3* set at the center point. Then rotate *C3*, and it will be found that other phone signals, within 10 kc., may be tuned in without retuning the receiver itself. Then set *C3* back at the center point, and tune in the signals with the receiver in the normal manner. Either method of tuning may be used, although the latter is more convenient with phone reception.

## Mobile Considerations

For the mobile model, the operations requiring tuning of *C3*, should be made by tuning *L2* slug instead, which should remain fixed after the proper setting has been determined.

With the *Selectivity* control set for the utmost selectivity, a tendency to howl may be noted as the receiver is tuned into the sidebands of a particular signal. This is a characteristic which can be found in almost any type of filter having extremely sharp selectivity. Undoubtedly, the selectivity at this point will be too great for good intelligibility, so a reduction in selectivity will be desirable with the attendant elimination of the howling effect.

The selector switch may be rotated back and forth between *Off* and *Peak*, so that selectivity comparisons can be made with and without the *Q Multiplier* in the circuit.

C-w signals, with the receiver's b.f.o. turned on, should also be tuned and checked in the same manner as described above. A b-f-o beat of from 500 to 1000 cycles should be used. The crystal-like sharpness of c-w signals will make tuning the receiver alone rather critical, and it will be found best to tune the receiver as near as possible to a c-w signal, and then to use the *Q Multiplier* tuning control *C3* for precise tuning or peaking.

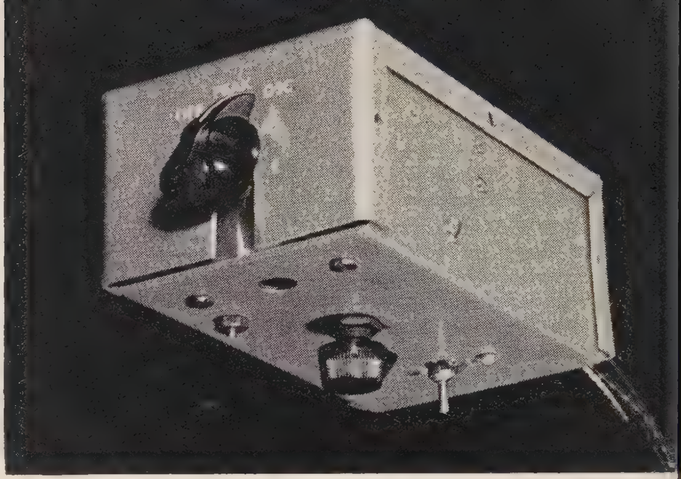
Just as a howling effect may be noticed at the sidebands of a phone signal, so a similar effect may be found when an extremely selective filter is used for the reception of c-w signals. This will be in the form of a bell-like ringing sound at the peak of the signal. Here also, the selectivity may be reduced slightly for optimum readability.

## SSB Reception

For SSB reception, set the *Q Multiplier* at *Off*. Also turn on the b.f.o., and tune it to the i.f. This point is often marked on the receiver. If it is not, it may be found approximately by tuning the b.f.o. for the lowest pitched background noise when no signal is present.

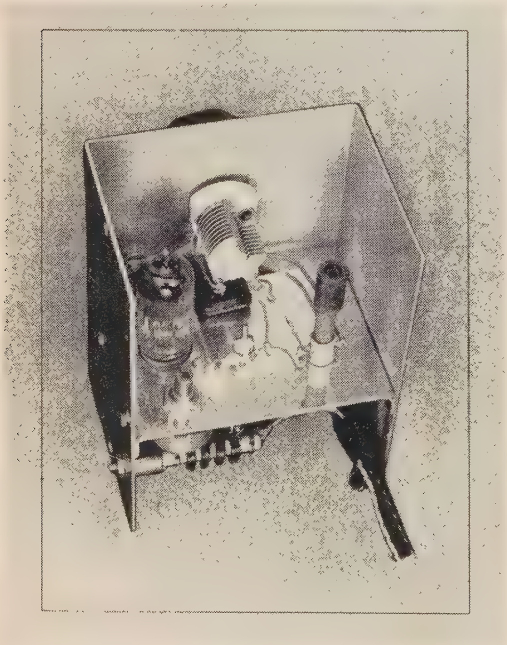
After the b.f.o. has been set, a SSB signal should be tuned in for the best intelligibility and naturalness of voice. To avoid overloading of the receiver, and to prevent messing up the a-v-c system, the a-f volume control should be turned way up, and the r-f gain control should be turned down to a comfortable listening level.

The mobile model of the "Q-Multiplier" has only a switch on the front panel. The knob on the bottom is for varying the position of the selectivity peak in the passband via L2.



Then set the *Q Multiplier* at *Peak* and rotate *C3* to a point where the best signal level and best audio frequency response is realized. If the receiver has not been tuned exactly to frequency during the initial tuning, it may be necessary to trim its tuning slightly at this time to produce the most natural sounding voice.

If the receiver's h-f oscillator is on the high frequency side of the received signal (this is the case in most communications receivers), the *Q Multiplier* will peak the upper sideband when *C3* is rotated towards maximum capacitance, and the lower sideband when it is rotated towards minimum capacitance. The direction in which *C3* must be rotated to obtain the best signal level will indicate which sideband is being transmitted. If the transmitted sideband is known beforehand (on 14 Mc. the upper sideband is usually used; on 4 Mc., the lower), *C3* may be tuned slightly off center in the corresponding direction before the tuning described in the second previous paragraph, is made.



Above chassis view of the fixed station model which incorporates all of the "Q-Multiplier" features. The tuning condenser is C3 and the screw driver slotted potentiometer is R8.

As *C3* is rotated for the reception of the correct sideband, the quality, or audio frequency response, of the SSB voice signal will change, because the limits of the narrow passband of the *Q Multiplier* will shift to a different frequency spectrum according to the position of the peak in the normal passband of the receiver. As an example, if the peak is set for 1 kc. off center, and if the filter selectivity has a bandwidth of 1 kc. at the 6 db. points, then the received a-f response will be 500 to 1500 cycles. The peak at 1000 cycles will be the reference, and the points at 500 and 1500 cycles will be down 6 db.

The *Q Multiplier* will therefore enable the operator not only to select the correct sideband with ease, but also will enable him to obtain the most desirable audio frequency response, according to the position of the peak and the degree of selectivity. At the same time adjacent QRM may either be eliminated or substantially reduced due to the selectivity of the system.

As pointed out earlier, the tuning of the b.f.o. or the reeciver itself does not have to be changed as the *Q Multiplier* is adjusted, which together with the procedures described above, makes the tuning of SSB signals simpler than that required with other methods.

## Null Position

Set the *Q Multiplier* switch to *Off*, and with the receiver's b.f.o. also turned off, tune in a steady unmodulated carrier. Then disable the a.v.c., turn on the b.f.o., and tune the latter for a beat note of from 500 to 1000 cycles. Set the *Q Multiplier Null Depth* control *R8* (screw driver adjustment) at about its midpoint, and rotate the selector switch to *Null*. Adjust *C3* until the a-f level of the beat note drops to a minimum. Adjust *R8* for a better minimum. Then alternately adjust *C3* and *R8* until the best null is attained. The adjustment of both *C3* and *R8* will be very sharp, and careful manipulation of these controls will produce a nearly complete null.

*(Continued on page 63)*

# the Complete 25'er

### Anthony J. Patti, W2YPQ

The 25-watt, four-band, phone/CW transmitter
escribed in this article has a number of features
interest to the Novice and old timer alike. It
vers the amateur spectrum between 7 and 30
egacycles and features optional crystal or built-
variable-frequency control. It will feed power
o practically any type of antenna.

This unit offers the Novice the opportunity to
ild a modern transmitter, which he may use
mediately as a crystal-controlled, code trans-
itter in the 7.2-Mc. and 21.2-Mc. Novice bands.
ter, when he obtains his *General Class* license,
can expand his scope of operations to include
h phone and code on the 7-, 14-, 21-, and 28-
. bands, utilizing the advantages of the v.f.o.,
of crystal control, as conditions indicate.

t should appeal to the old timer for the same
sons that impelled the writer to design and
ld it. At W2YPQ, the *Complete 25'er* serves
an ever-ready portable and emergency trans-
ter. It is often used at hamfests, field days, and radio club meetings, where it has been quite valuable "talking in" visiting mobiles.

At home, the transmitter is usually set up on the 28-Mc. band and connected to a ground-plane antenna in the attic. It is fine for talking to the local gang when it is inadvisable to turn on the "big" rig. It does an exceptionally good job working mobiles because of the vertically-polarized antenna. The transmitter causes not a flicker of TVI on my 1950-model television receiver, the antenna of which is mounted on the roof, directly above the transmitting antenna.

The transmitter has not been used as consistently on the other bands as it has on 28 Mc., because I have other transmitters for them; nevertheless, it gives an excellent account of itself on these bands, and I have had many contacts on them, especially on 7 Mc., where it feeds a ½-wave antenna about thirty feet high.

Oh yes, the transmitter has served as an emergency exciter for a pair of 813's.

## The Circuit

The circuit (*Fig. 1*) of the *Complete 25'er* was chosen to provide a maximum of operating flexibility, without evolving a mechanical and electrical horror to construct. It starts out with a 6C4 in a conventional, "plate tickler," variable-frequency oscillator, covering 3500 to 3700 kc. No claims are made that this is the best-possible circuit, but it has given satisfactory service in the W2YPQ mobile since 1949. The v.f.o. drives a second 6C4 as a fixed-tuned, 7 Mc., frequency multiplier, which becomes the oscillator during crystal-controlled operations.

The third tube is a 6AK6 pentode, operating as an amplifier, frequency doubler, tripler, or quadrupler, depending on the mode of operation. Its pre-tuned, plate-tank coil is plug-in for band changing. This stage is keyed in its cathode circuit for c-w operation.

The 6AK6 drives a 2E26 in the output stage, which utilizes a *pi*-network output circuit, that is capable of delivering power to a wide range of antenna load impedances. Being specifically designed for radio-frequency service, the 2E26 is more satisfactory than the audio-frequency pentodes frequently used in the output stage of low-power transmitters.* A 47-ohm resistor (*R7*) in series with its grid lead, right at the tube socket, eliminated all trace of instability in the stage.

Modulation is accomplished with a pair of 6AQ5's in parallel. Their output into the 2E26 plate circuit is through the primary of a 20-watt, replacement-type, push-pull, speaker-matching transformer, which acts as a center-tapped modulation choke. A 6BA6 and a 6AT6 in cascade drive the 6AQ5's. They have sufficient amplification to permit using a crystal microphone or other low-cost microphone with the transmitter.

A conventional power supply, built around a replacement-type "TV" power transformer, a 5UG4 rectifier and a condenser-input filter, powers the transmitter. Its output voltage is approximately 350 volts at a normal current drain of 150 milliamperes.

Although not quite as convenient as band switching, using plug-in coils in the last two stages greatly reduces constructional complexities in the transmitter. Besides, it takes only a few seconds to change coils and to tune up on a different band. Spare coils are clipped into large fuse clips fastened to the inside of the cover.

The 3.5-Mc band is not covered, because I am not particularly interested in that band, and I did not think the added coverage would be worth the trouble of including it in the transmitter.*

**C1**—17.5 μμfd., ceramic insulated midget variable *(Hammarlund HF-15)*.
**C2, C3, C4**—100 μfd., NPO ceramics.
**C5, C22, C29**—0.01 μfd., ceramics, 600v.
**C6, C8, C12** — 47 μμfd., mica.
**C7, C9, C10, C11, C13, C14, C19**—1800 μμfd., ceramics (0.002 μfd. will be o.k.).
**C15**—0.0047 μfd., mica.
**C16** — 100 μμfd., midget variable.
**C17**—140 to 250 μμfd., variable *(see text)*.
**C18** — 0.1 μfd., paper, 600v.
**C20**—0.005 μfd., paper, 600v.
**C21**—10.0 μfd., 25v., electrolytic.
**C23**—50.0 μfd., 50v., electrolytic.
**C24, C25, C26** — Three-section, 10.0 μfd., 450v., electrolytic *(CD type QC-11145)*.
**C27**—33 μμfd., ceramic.
**C28**—3-30 μμfd., ceramic trimmers *(Erie TS2A-4)* FOUR are required.
**C30**—0.001 μfd., mica or ceramic.
**Ch** — 7 henries, 150-ma., filter choke *(Stancor C-1710)*.
**F**—2-amp fuse and holder *(Buss HKP)*.
**M** — Milliammeter, 100-150 ma.
**R1**—47,000 ohms, ½w.
**R2**—68,000 ohms, ½w.
**R3, R5** — 56,000 ohms, ½w.
**R4**—560 ohms, 1w.
**R6**—27,000 ohms, ½w.
**R7**—47 ohms, ½w.
**R8**—270 ohms, 2w.
**R9, R10** — 68,000 ohms, 2w.
**R11, R13** — 1.0 megohm, ½w.
**R12**—1200 ohms, ½w.
**R14, R23**—470,000 ohms, ½w.
**R15**—500,000-ohm potentiometer.
**R16**—1000 ohms, ½w.
**R17**—100,000 ohms, ½w.
**R18**—250 ohms, 10w.
**R19**—20,000 ohms, 10w.
**R20**—3000 ohms, 10w.
**R21**—47,000 ohms, 2w.
**R22**—10,000 ohms, 10w.
**R24**—10,000 ohms, 1w.
**RFC**—2.5 mh., r-f choke.
**Ry1**—DPDT relay, 6-volt a-c coil *(Guardian KR11A)*.
**Sw1** — Two-pole, 2-position, rotary switch *(Mallory 3222-J)*.
**Sw2, Sw4, Sw5** — DPDT toggle switches.
**Sw3** — DPST toggle switch.
**T1** — 400-O-400 volts @ 200 ma., 5v. @ 3 amps., 6.3v. @ 5 amp. *(Stancor PM-8412)*.
**T2** — Push-pull, 20-watt, output, 10,000 ohms plate-to-plate *(Stancor A-3830)*.
**Chassis**—7x13x2".
**Cabinet** — 7x14x8" *(Bud C-995)*.

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* For the same reasons, it would seem logical to substitute a 5763 for the 6AK6. Besides being specifically designed for r-f work, the 5763 is much more rugged than the 6AK6. The difference in the cost of the two tubes is 30 to 35 cents—Editor.

* Adding 3.5-Mc. coverage to the transmitter while retaining the 21- and 28-Mc. bands would require redesigning the r-f section almost completely. However, it should not be extremely difficult to shift the coverage to 3.5 to 14.4 Mc. This would entail shifting the v.f.o. to 1.8 Mc., the second stage to 3.5 Mc, and winding 3.5-Mc. coils for the 6AK6 and 2E26 stages. This could be accomplished by approximately doubling the number of turns specified in *Table I* for *L1*, *L2*, and *L3* and the 7-Mc., *L4* and *L5* coils. Also, the capacity of *C1* would have to be doubled, to permit covering the entire 3.5-4 Mc. band. A grid-dip oscillator would be invaluable in adjusting the new coils. This information is included here to spare W2YPQ unnecessary correspondence.—Editor.

**"Tony" Patti was originally licensed in 1938 as W3HQK. The W2 call came about in 1948. W2YPQ holds a class A license and activity is noted on 10, 20 and 40 meters. Both phone and CW are used. Tony likes to build equipment as well as spending some time ragchewing. Mobile on 10 meters with home-built equipment. War service in the Fifth Army. Last month Tony was elected president of the South Jersey Radio Association. Employed as a customer engineer for IBM in the electric accounting division. W2YPQ is married and the father of two charming daughters. Home address: 1912 Bryn Mawr Ave. Haddon Heights, N.J.**

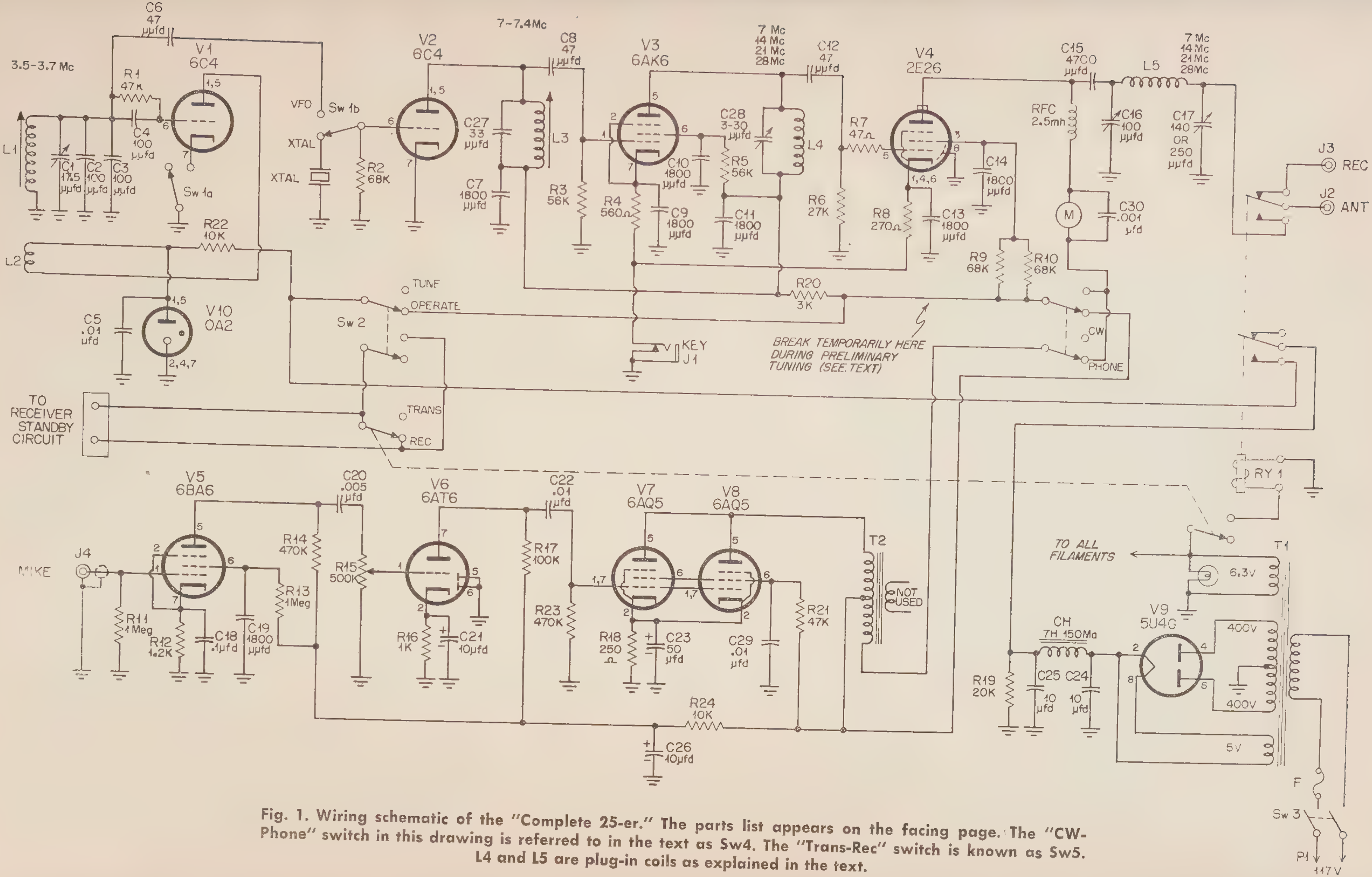
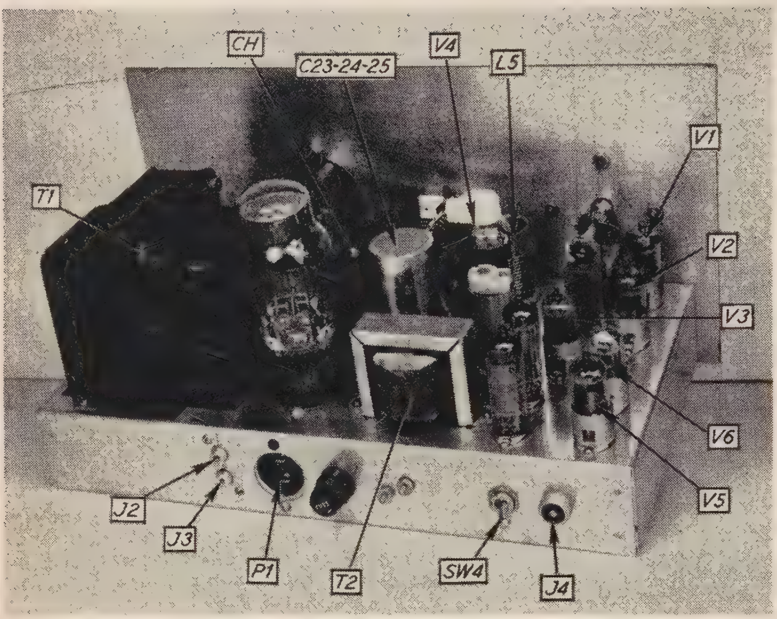


Fig. 1. Wiring schematic of the "Complete 25-er." The parts list appears on the facing page. The "CW-Phone" switch in this drawing is referred to in the text as Sw4. The "Trans-Rec" switch is known as Sw5. L4 and L5 are plug-in coils as explained in the text.



**Top rear view of the "25-er." Since this photo was taken, a two-contact terminal strip has been added to the rear chassis lip. This is shown in the schematic on the preceding page as, "To Receiver Standby Circuit."**

## Construction

The *Complete 25'er* is built on a 7x13x2-inch chassis and housed in a 7x14x8-inch cabinet (*Bud C-995*), with an 7x14-inch aluminum panel. The photographs show clearly its appearance and the placement of most of the parts, while *Figs. 2* and *3* serve as drilling templates for the coil and tube socket holes and for the panel controls.

The positions of the power supply components and the output modulation choke are not critical and will depend largely upon the particular components used. For example, the power transformer suggested in the parts list (*Stancor PM-8412*) is different from the one actually used in the original model. The suggested transformer has the same ratings, but the new dimensions permit mounting it in the space available more easily. The remaining power-supply components may be mounted as space permits.

While drilling the chassis, drill a handful of ¼-inch to ⅜-inch holes in each end to improve the air circulation under it.

As can be seen in the under-the-chassis photo, condenser *C1* is mounted below the chassis and is coupled to its dial by means of a home-built right-angle drive, similar to the *National ACD*. Actually, this construction is hardly necessary. I suggest mounting the condenser in the conventional manner on a small bracket above the chassis. Couple it to its dial through a semi-flexible shaft coupling and use #14 wire between it and the other components of the stage.

Another possible modification is in the antenna loading capacitor *C-17*. Referring to the front photo and drilling template, there is a relatively wide space (2¾") between it and the transmit/receive switch *Sw5*. *At one time an additional*, 100-μμfd, variable capacitor was mounted in this space and connected across *C17*, to allow greater control of antenna loading on 7 Mc., when a very low-impedance antenna was being used. A single, 250-μμfd. condenser at *C17* will normally give all the control required, and a slightly more-symmetrical panel will result if it is spaced equally between *Sw2* and *Sw5*.

The v.f.o. condenser *C1* is controlled by a *National AM*, 5:1 ratio vernier dial, and the *pi*-network input condenser *C16* is controlled by the *National P* dial, which matches the *AM* dial in appearance, but is directly driven.

Across the back of the chassis are mounted, left to right; two *RCA*-type phono connectors, one

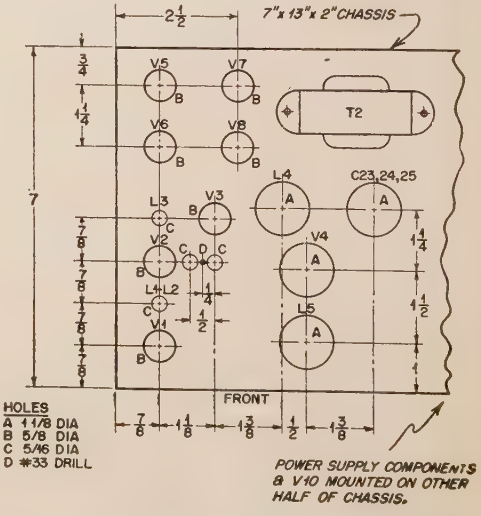


**Fig. 2. Partial drilling template showing the positions of the tubes, crystal, etc. Compare this with the photograph at the top of this page.**

## Table I—Coil Data

L1—32 turns, No-28, enam. wire, close wound on ¼" slug-tuned form.
L2—38 turns, No-28, enam. wire, close wound, ⅛" below L1.
Both windings wound in same direction. Connect top of L1 to 6C4 grid and bottom of L2 to plate.
L3—65 turns, No-30, enam. wire, close wound on ¼" slug-tuned form.
L4—All coils close wound of No-22 enam. wire on 1-inch forms.
7 Mc.: 22 turns.
14 Mc.: 10 turns.
21 Mc.: 7 turns.
28 Mc.: 5 turns.
Note: A 3-30 μμfd., ceramic trimmer condenser is mounted permanently across each L4 coil. See text for details.
L5—7 Mc.: 18 turns, No-16, 1¼" in diameter, 1¼" long.
14 Mc.: 8 turns, No-16, 1¼" in diameter, 1" long.
21 Mc.: 8 turns, No-14, 1" diameter, 1" long.
28 Mc.: 5 turns, No-14, 1" diameter, 1" long.

ove the other, for the antenna input connection d the connection to the receiver antenna terinal; recessed male a-c power receptacle; fuse lder; phone/CW switch *Sw4*; and microphone nnector. After the picture was taken, a tworminal strip was added to the left of the annna terminals to accommodate the auxiliary set contacts on *Sw5*. These terminals connect to e receiver "standby" terminals, to make switchg from "transmit" to "receive" a single-switch eration.

The remaining components are mounted on the assis near their associated tube sockets. Conlt the bottom picture for approximate positions. r a permanent job, use lock washers under each ounting nut. Mount *R15* and its extension shaft rly; so that you do not block the path of the ft with other components.

Most of the fixed resistors and condensers are supported by cutting their leads short and connecting them directly between the socket terminals and ground or associated components. Several insulated tie points are mounted on the chassis where required for additional supports.

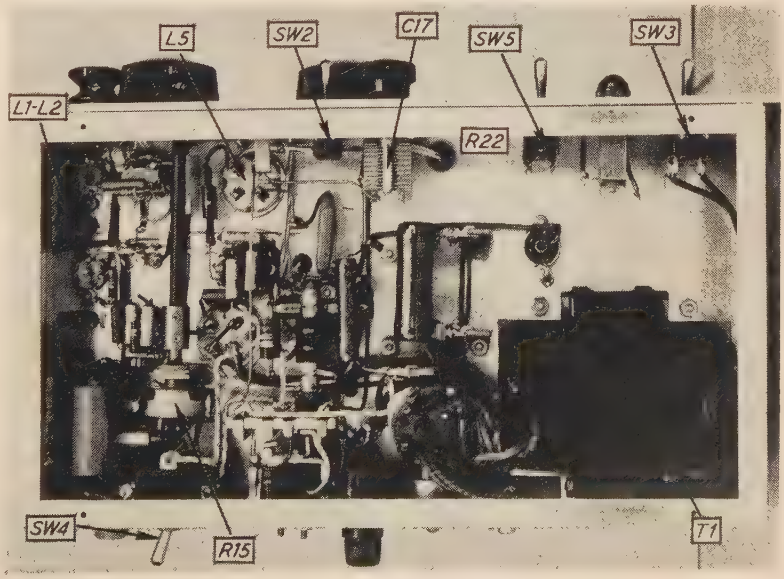
Wiring is essentially point-to-point, using solid, tinned wire for the plate and control-grid leads in the r-f section and flexible, insulated wire for the remaining connections. Shielded wire is used between the microphone connector and the control grid of the 6BA6 and for the connections to the gain control *R15*. Normal precautions were employed to keep all r-f leads short.

I made provision for shielding the first three r-f tubes and the speech-amplifier tubes, but there is no difference in the operation of the transmitter with the shields on or off; therefore, they are normally left off. Nevertheless, it is possible that the partial shielding offered by their bottom halves provided all the shielding that may be required.

Full coil data is given in *Table I, L1/L2,* and *L3* are wound on slug-tuned, ¼-inch diameter forms. I used the forms from *RCA 71426*, TV i-f transformers, from which I stripped off the original windings. The four *L4* coils and the two higher-frequency coils for *L5* are one inch in diameter (*Millen 45004*), and the two low-frequency coils for this position are 1¼ inches in diameter.

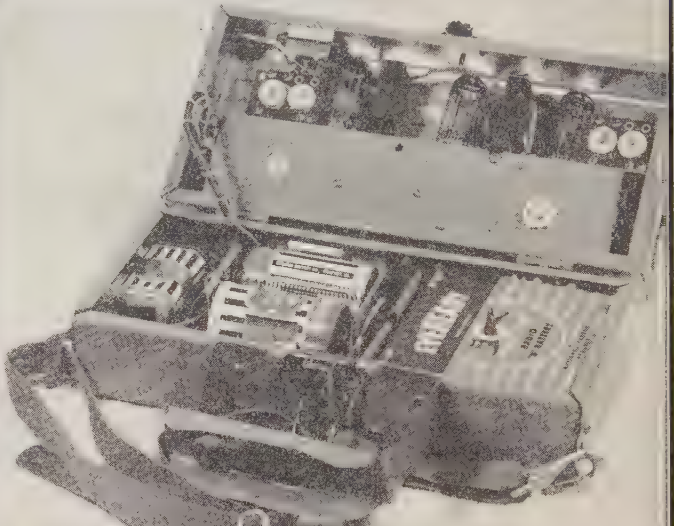
Each *L4* coil has a 3-30 μμfd., adjustable ceramic condenser (*C27*) connected permanently across it. Solder stiff, tinned leads to each condenser and thread them through the coil socket pins from the top. Pull tight and solder. If it is difficult to thread these wires into the same socket prongs in which the coil windings terminate, use the other pair of prongs. Then solder jumper wires across the socket terminals to connect the condenser across the winding.

*(Continued on page 60)*



**tom placement view. The hor mounted C1 on a t angle and, although labelled in this diagram, an be seen just to the left the R15 extension shaft ween L1/L2 and L5. See t on the location of C17.**

# the Strapset



**Clifford C. Johnson, W0URQ***

1258 Van Buren, St. Paul E-4, Minn.

Many types of handy-talkie transmitter-receiver combinations have been described and pictured in the radio periodicals and this one is different only in certain details and refinements that make it especially suitable for its intended application. While this type of gear is largely a novelty to the individual Ham, it has very definite and important uses in club activities and Civil Defense work.

Six-meter operation was selected so the unit could be used in conjunction with *Packsets*[1] for local work. It is designed for low battery drain, simplicity, and ruggedness as well as convenience in operating. Since it is made to be carried, a shoulder strap is provided for the occasions that require a long period of operation. The kind of walkie-talkie you hold up to your ear has considerable sales appeal, but if you have to use one for any length of tim it soon becomes tiresome to your arm, wherea a telephone handset that can be returned to i cradle is a distinct advantage. The inexpensiv telephone sets currently available should wor very well although the one pictured is surplus.

Note the absence of external tuning co trols. In actual operation this type of gear i used on only one frequency in conjunction wit a fixed station or net so it is not necessary t have it readily tunable. In fact, in club a tivities where a great many fellows operate th equipment it is highly desirable not to hav tuning controls where they can be tampere

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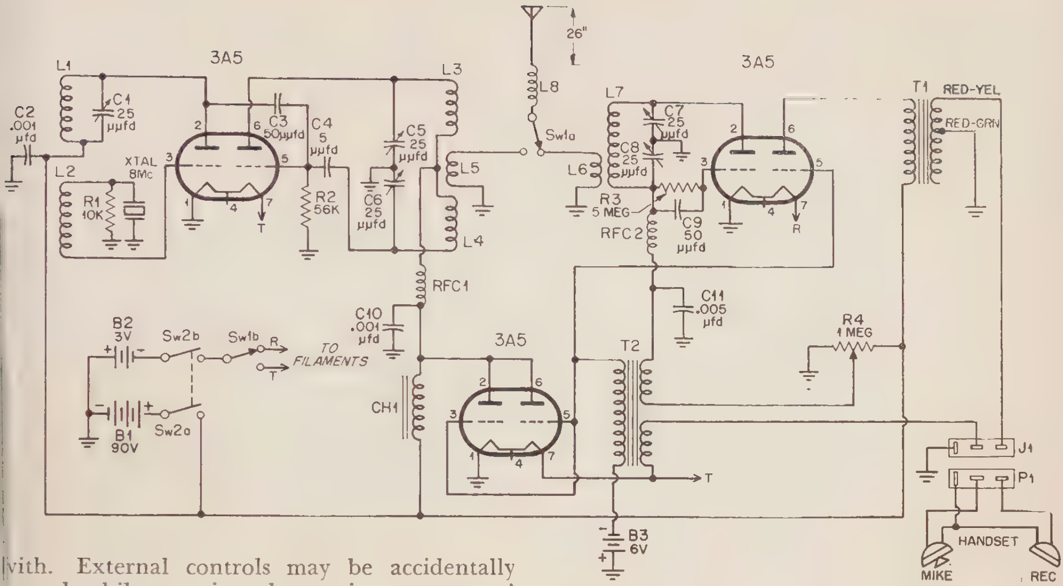
[1] Johnson, "10/6 Packset," *CQ*, May and July, 1954, pp. 52 and 26, respectively.

* A biography of the author appeared in conjunction wi his article in the October 1954 issue.

† The handset shown in the cover photograph is a Wes ern Electric "MS-100-E." It contains a regular F-1 ca bon microphone button and a 200-ohm earphone uni Various other handsets are available at war-surpl huoses throughout the country.—Editor.



vith. External controls may be accidentally noved while carrying the equipment around nd a protruding crystal might even get lost. )nly two switches are accessible for operation, battery "off-on" and the "push-to-talk" switch. The latter is on top next to the antenna where is not only convenient for operation, but ermits the shortest possible leads for coupling he link to the antenna to keep losses at a inimum.

### Unusual Construction

The unique feature of this strap-set is the book" type of construction with the radio gear n one side and all batteries in the other half f the book. In this fashion they may be hanged readily. All tuning controls are screw-river adjustments and are accessible when the ase is open. Both the transmitter and re-eiver may be tuned to any frequency within ne band. Tubes and crystal are easy to change nd only one tube type is used. The construc-on is simplified by building the entire radio ortion on an inverted "L" shaped chassis hich fastens into one side of the case and can taken out by removing a few stud bolts.

The circuit is one which attempts to get the ost out of the least parts. The oscillator iples from 8-megacycle crystals in one half of ne 3A5 tube and doubles to the output fre-uency in the second half. This triode section connected as a neutralized doubler to get a ttle extra output. The valve of *C4* is not itical and a 5 μμfd. ceramic is about optimum. he 3A5 modulator triodes are connected in arallel for a little more audio. A small filter hoke seems to give better modulation than any ansformer tried in the Heising circuit. The lit stator tank condenser *(C5-C6)* is made of vo ceramic trimmers connected together. The me arrangement is used in the receiver to iminate body effects or noise when tuning up.

**C1, C5, C6, C7, C8**—5-25 μμfd., ceramic variable, Erie 557.
**C2, C10**—0.001 μfd., disc ceramic.
**C3, C9**—50 μμfd., tubular ceramic.
**C4**—5 μμfd., tubular ceramic.
**C11**—0.005 μfd., disc ceramic.
**Ch1**—Small size filter choke with a resistance between 200 and 300 ohms.
**R1**—10,000 ohms, ½w.
**R2**—56,000 ohms, ½w.
**R3**—5.0 megohms, ½w.
**R4**—1.0 megohm potentiometer.
**RFC1, RFC2**—R-f chokes, National R-33.
**Sw1a/Sw1b, Sw2a/Sw2b**—DPDT slide switch.
**T1**—Output transformer, Triad M1X modulation.
**T2**—Transceiver transformer, Triad A21X.
**Batteries**—Two size "D" flashlight, one 6-volt Burgess Z4 for bias and a 90-volt Burgess N60 for the plates.

Parts list and wiring diagram

The complete receiver is just one tube, a super-regenerative detector with one stage of audio. The usual objection to the rush box receiver holds true with this one, but the radiation is only a few hundred feet and it was not deemed worthwhile to spend battery current on an r-f stage. No other simple receiver has the particular virtues of the super-regenerative for this type of gear. It is broad enough to be fixed tuned and left without any further adjustment for the kind of operation the *Strap Set* is designed for. The receiver volume is about the same as one has over the ordinary telephone.

### Modulation

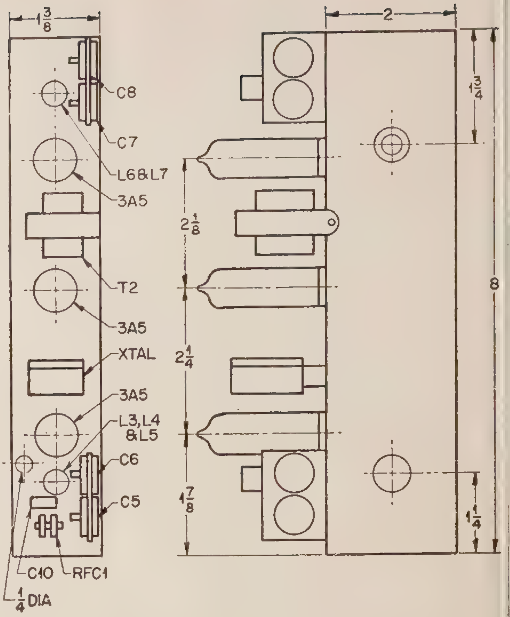
A regular transceiver audio and mike transformer is used. Note that the secondary is common to both the transmitter and receiver audio with a common bias battery. This arrangement is possible because switching from "Receive" to "Transmit" is done in the filament circuit. The 3A5 filaments are operated in series (series parallel in the transmitter section) from standard size "D" flashlight batteries not only to lower the battery current, but to put 3 volts on the mike which is energized only when the transmitter filaments are turned on. *T1* is actually a modulation transformer (*Triad M1X*) with the secondary taps connected to match the 200-ohm telephone type handset.

The three r-f coils are wound on ⅜-inch diameter polystyrene rod tapped at one end for mounting bolts. The oscillator coil is wound slightly different than customary when using this circuit with cathode type tubes. It works very smoothly although the output will vary considerably depending upon the activity of the crystal used.

Two standard aluminum chassis 5"x9½"x1½" are hinged together to make the case for the strap set. One side contains all the batteries and the battery switch. It also has the handset cradle and carrying strap attached to it. The bias battery is fastened in with a clamp and the B battery fits in at the opposite end. The flashlight batteries are held in place by a battery container commonly used in model airplanes. This container is modified to allow series connection of the "A" batteries by drilling holes in the end and installing insulated bolts which are jumpered together to put the cells in series. A small trunk snap bolted to the top of the case holds it together.

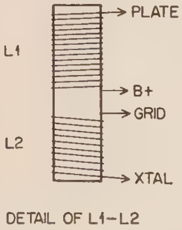
## Wiring and Operation

Hardware store flashing tin is used to make the chassis which is 8" long by 1⅜" on top where the tubes mount, with a two-inch side bent down to form the "L." The ends are turned in and soldered to the top for strength. A ¼-inch lip is turned up from the top and sides and small nuts soldered to it to take stud bolts when fastening it into the case. A three-prong *Jones* connector is mounted on the receiver end of the chassis and a corresponding cutout made in the case to insert the plug from the handset. Flexible leads are run between the batteries and the radio chassis going through a grommetted hole in the transmitter end and attached to a terminal strip.



Approximate chassis layout sketch

### Coil Data



L1—15 turns, #26 enam. spaced to occupy ⅝" on a ⅜" dia. polystyrene rod cut to 1⅜" long.

L2—10 turns, #30 cotton covered wire, close wound in opposite direction of L1 (on same form) at the B plus end.

L3—6 turns, #26 enam. spaced to occupy ½" on a ⅜" dia. polystyrene rod cut 1⅜" long.

L4—Same as L3, wound ⅛" from that winding on same form.

L5—2 turns of hookup wire wound between L3 and L4.

L6—3 turns, #26 enam. located about ⅛" below grid end of L7.

L7—14 turns, #26 enam. spaced wire diameter on a ⅜" dia. polystyrene rod cut 1⅜" long.

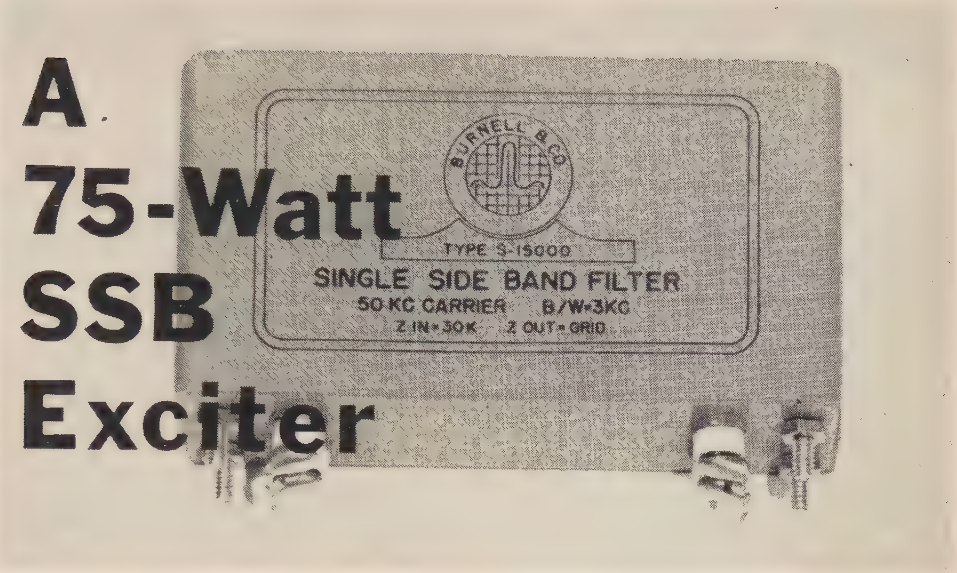
L8—Loading coil, 14 turns, #26 enam., spaced 1½" on a ½" polystyrene rod 1¾" long.

The transmitter and receiver sections are at opposite ends of the chassis with the modulator tube in the middle. The interstage transformer *(T2)* is on top of the chassis and the output transformer *(T1)* is just below it on the inside. The regeneration control is below the detector tube and mounted in a ⅜-inch hole in the side of the chassis. It is cut off as short as possible and slotted with a hack saw for screwdriver adjustment. Both the transmitter and receiver split stator tuning condensers are made by mounting two ceramic variable trimmer condensers side-by-side on a thin sheet of bakelite which in turn is fastened to the chassis with a small metal bracket. This makes a compact, space-saving and vibration free tuning system. The modulation choke *(Ch1)* is inside the chassis below the crystal socket and the final tank coil is on top the chassis adjacent to the send-receive switch for short leads to the antenna.

The antenna is brought through the case by means of an *8-32* brass bolt insulated with fiber washers and secured on the outside with a nut

(*Continued on page* 67)

# A 75-Watt SSB Exciter



**Jack N. Brown, W3SHY**

Contributing Editor

The recently announced *Burnell S-15000* toroid filter adds one more piece of equipment to that available to the radio amateur for single-sideband reception and generation. This miniaturized 50-kilocycle filter is ideal for use in SSB receiving adapters similar to the filter adapter described in *Chapter I* of "Single Sideband Techniques." Since the filter output is unbalanced (no center-tapped winding) the use of the varistor modulator is not possible. The easiest and most convenient expedient is to use a standard receiving-type of mixer tube as the 50-kc. detector. A separate 50-kc. oscillator tube could be utilized or the oscillator section of the pentagrid tube could be used for this carrier insertion function. Using the filter in a receiving adapter is a relatively simple process and the *Burnell Company* literature* should prove helpful along this line.

Use of the filter in a transmitter-exciter also suggests itself to the experimenter. Using filters whose pass-band frequency is below 200 kilocycles means a double heterodyning process in order to translate in frequency the 50-kc. sideband signal to some useful amateur frequency. This is necessary to eliminate the unwanted products of mixing from the desired SSB signal.

### The Exciter Block Diagram

It was decided to design and lay out this exciter in a manner similar to that of the exciter described in *Chapter VIII* of my recent book. The operation and control features are in all respects similar with a minor exception concerning the sideband switching feature. All other features are the same: voice control operation, receiver anti-trip, carrier insertion, sideband switching, VFO control, fundamental 4.0 megacycle output and provisions for working 40 and 20 meters.

It was decided to incorporate two parallel output tubes instead of the single 6146 tube employed in the *Chap. VIII* exciter. This was done to give the operator who has no desire for a full-gallon station, a moderate amount of power in a small package so that he would not be in the "bare-footed" exciter class. The exciter is capable of 75 watts output peak-power and the nominal "meter-power" is about 100 watts input.

Refer to *Fig. 1.* The microphone feeds the Speech Amp. which is a two-stage dual-triode (type 6SN7) arrangement. This in turn feeds the speech signal to the Cathode Follower isolation

**The popularity of the SSB exciter described in "Single Sideband Techniques" led the author to design a similar transmitter with a little more power output and using a toroid filter for sideband selection. Many of the features in this transmitter are identical to those detailed in Chapter VIII of "Single Sideband Techniques." In order to reduce unnecessary duplication, the reader will note considerable cross-referencing. In particular, the power supply is not shown as it is an exact duplicate of the one outlined on pages 82 and 84 of the SSB book. This is a two-part story with the second part appearing in the February issue. —Editor.**

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* See the booklet, "Low Cost Single Sideband for Amateur and Commercial Equipment." Burnell & Co. Inc., Yonkers 2, N. Y.

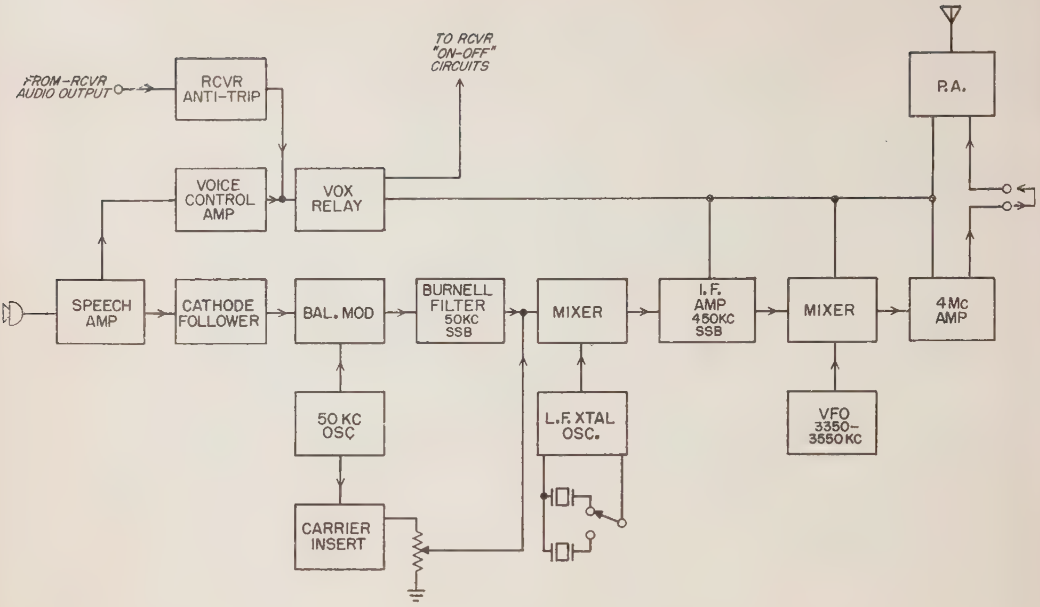


**Fig. 1. Block diagram of the unit described in this two-part article.**

and impedance matching stage. The Balanced Modulator stage operates at a 50-kilocycle frequency and combines the speech signal from the Cathode Follower stage with the 50-kilocycle r-f signal from the 50-Kc. Oscillator stage. Thus at the input to the *Burnell S-15000* filter there exists a double-sideband suppressed-carrier signal in the 50-kilocycle part of the spectrum.

The *Burnell* Filter now performs the task of removing the upper sideband and passing the lower sideband. So the signal remaining at the filter output is a lower sideband signal occupying the 3-kc. band just below 50 kilocycles, that is, the suppressed carrier frequency is at 50 kc. and the sideband energy is distributed down to about 47 kc. The single sideband signal has now been generated and the carrier thoroughly suppressed and the remaining task is to hererodyne it up to a useful frequency and amplify it sufficiently to justify radiation.

### Sideband Switching

The first Mixer stage accomplishes one step of the necessary double-heterodyne process already mentioned. This stage mixes the 50-kc. SSB signal with one of two possible crystal oscillator frequencies so that the desired mixture frequency is near 450 kilocycles. It is at this point that the sideband switching feature is also added. The stage labelled L.F. Xtal Oscillator is a Pierce oscillator with one of two possible crystals chosen by the sideband switch. The two crystals that were chosen for this particular exciter were at 400 and 500 kilocycles. These exact frequencies are unnecessary for proper operation, as any pair of low-frequency crystals that are 100 kilocycles apart in frequency may be used. The frequency that lies mid-way between the two crystal frequencies must, however, fall within the tuning range of the i-f transformers used in the unit. Thus the output of the first Mixer is tuned to 450 kilocycles. If the sideband switch is thrown so that the 400 kilocycle crystal is used in the L.F. Xtal Osc. circuit, the resultant SSB signal at 450 kilocycles will be a lower-sideband signal. If the 500-kc. crystal is used, the resultant signal will be an upper-sideband signal whose suppressed-carrier frequency is at 450 kilocycles.

The advantage of using this system of sideband switching over that used in the SSB exciter described in *Chapter VIII* is that the carrier frequency remains fixed while the sideband actually "flips" over to the other side of the carrier frequency. This makes retuning of the transmitter unnecessary when it is desired to remain on the same carrier frequency and change sidebands. Sideband switching with the mechanical filter necessitated returning the v.f.o. three kilocycles so that the sideband would have the same carrier frequency as the original sideband.

The I.F. Amplifier is for isolation purposes more than for amplification. The selectivity of two i-f transformers is necessary to separate the 450-kc. SSB signal from the heterodyning oscillator signal at 400 or 500 kilocycles. These two extra signals must be thoroughly suppressed at this point since the high-frequency tuned circuits that follow will offer little selectivity for signals that lies only 50 kilocycles from the output signal.

The second Mixer stage is the conversion stage that mixes the 450-kilocycle SSB signal with the signal from the VFO that operates between 3350 to 3550 kc. The sum-mixture is chosen which now places the SSB signal in the 75-meter band. Thus the MIXER output circuit is tuned to the 4.0-megacycle band. Since an additive mixing arrangement was used in the second MIXER the sideband is still a lower sideband if the original 450-kc. signal was a lower sideband. The reverse is true, that is, if the 450-kc. signal is an upper-sideband signal, the 75-meter signal will also be an upper sideband signal.

The signal is now amplified in the 4-MC. AMPLIFIER. This amplifier operates in class A or $AB_1$ and brings the signal level up sufficiently to drive the next stage. The 4-MC. AMPLIFIER output can be connected to an external band-changing heterodyne unit (see *Chapter X of "SSB Techniques"*) or patched straight through to the POWER AMPLIFIER. This output stage operates in class $AB_1$ and gives an output of 75 to 100 watts peak output. A conservative figure of 75 watts is given for an acceptable amount of distortion products (30 to 35 db.).

The carrier insertion feature was temporarily neglected in this discussion so that the signal channel could be dealt with with continuity. The block labelled CARRIER INSERTION takes a portion of the 50-KC. OSCILLATOR signal and feeds it around the sideband filter to the grid of the first MIXER stage grid. This permits inserting carrier for tune-up or operating purposes.

The block labelled VOICE CONTROL AMP. has two stages which amplify the speech signal, rectify it and operate the control relay (VOX RELAY). This enables the transmitter circuits to be energized when the microphone is spoken into. The receiver circuits are also simultaneously disabled when the transmitter is turned on. The relay controls the plate and screen voltages on the last three stages of the unit for efficient control of the system.

The RCVR. ANTI-TRIP stage enables the operator to use voice control operation and still enjoy the feature of receiving with the station loudspeaker. This prevents the loudspeaker signal from tripping the voice control circuits.

### The Speech Amplifier

Refer to *Fig. 2*. Tube *V1*, serves as the two-stage speech amplifier. The input circuit to *V1a* accommodates the usual variety of high impedance microphones. The small condenser, *C9*, from the grid of *V1* to ground is to prevent any r-f from getting into the audio channel. The remainder of the circuit is quite conventional and needs no explanation.

### The Cathode Follower

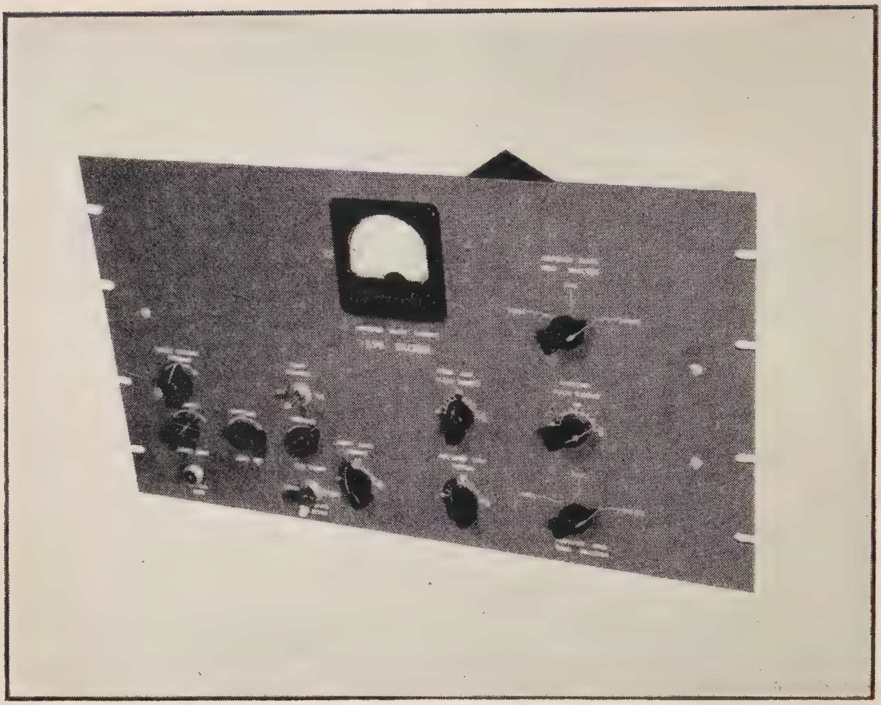
This stage, *V2a*, isolates the audio section from the 50-kc. balanced modulator and provides the proper input impedance conditions for the balanced modulator. The audio voltage measured across *R21* should not exceed 0.25 volts peak value. The coupling condenser, *C16*, is made larger than the same circuit when used to feed a 455-kc. balanced modulator.

### The Balanced Modulator

This circuit is the same configuration as that used with the 455-kc. mechanical filter with the exception that the size of two of the condensers were changed to make the proper impedance conditions hold true at the 50-kc. frequency. *C16* was made larger (now 1.0 $\mu$fd.) and *C17* was increased to 0.01 $\mu$fd. so that the audio input terminals would appear as a relatively low impedance at the 50-kc. oscillator frequency. The filter termination resistor, *R34*, had to be changed to 30,000 ohms in order to properly terminate the input impedance of the *Burnell S-15000* filter.

The phase inverter stage that feeds the 50-kc. oscillator signal to the two diodes operates as it did

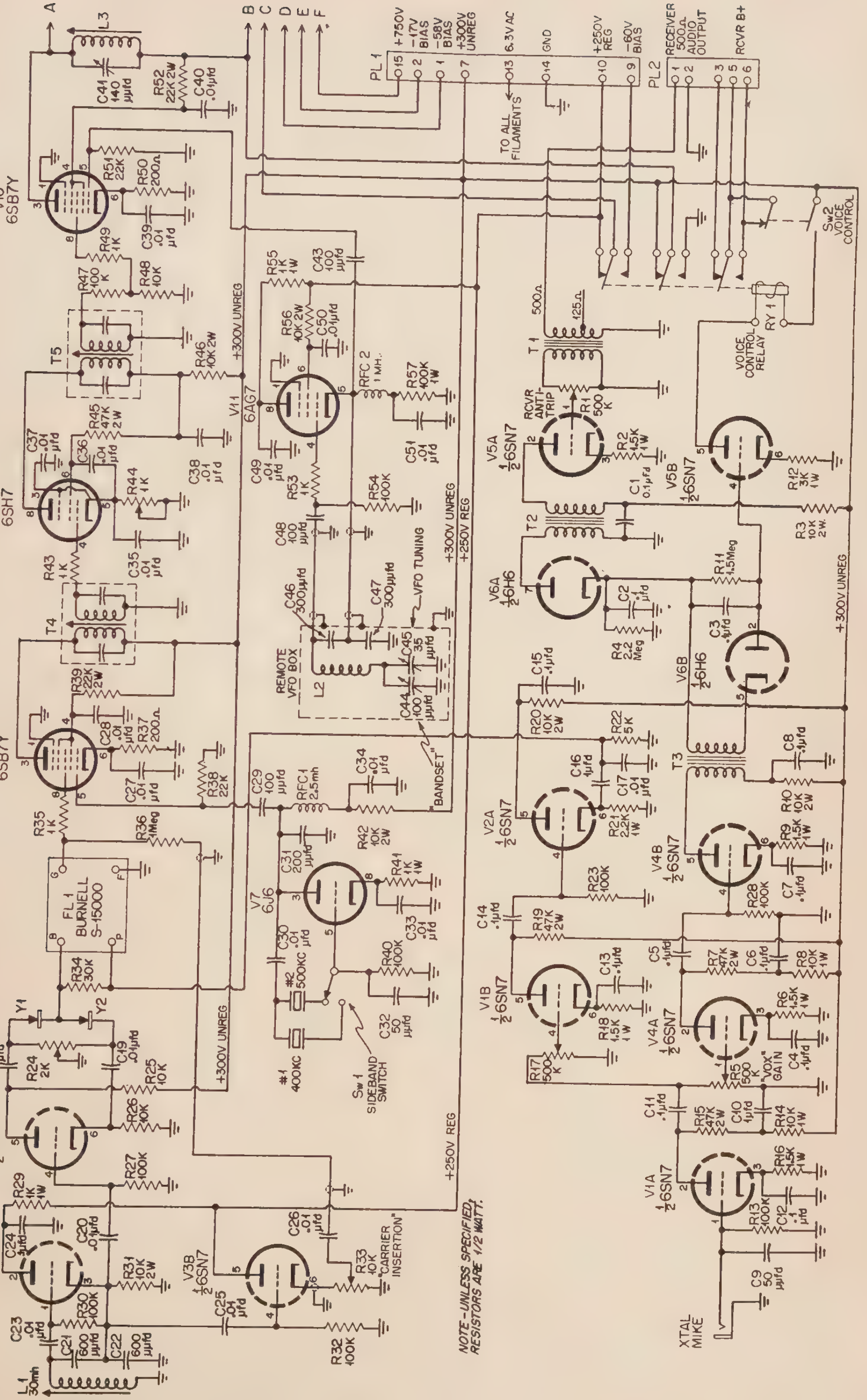
**Above rear chassis view of the "SSB 75-Watt Exciter." The Burnell filter is in the lower right hand corner of the chassis. The crystals used for sideband switching may be seen near the small Miller i-f transformers. Two 6146 tubes are partially hidden behind the shield.**



A Front panel view of the 75-watt SSB exciter.

Fig. 2. Wiring schematic and parts list. This list also contains those parts shown in the supplemental schematic on page 31 which shows the power amplifier stages.

**C1, C2, C3, C5, C6, C8, C11, C14, C15, C24**—0.1 µfd., 400v., metalized paper.
**C4, C7, C12, C13** — 0.1 µfd., 200 v., metalized paper.
**C9, C32**—50 µµfd., 500v., mica.
**C10**—1.0 µfd., 400v., metalized paper.
**C16**—1.0 µfd., 200v., metalized paper.
**C17, C18, C19, C20, C23, C25, C26, C27, C28, C30, C33, C34, C35, C36, C37, C38, C39, C40, C49, C50, C51, C53, C54, C56, C57, C58, C60, C64** — 0.01 µfd., 600v., tubular ceramic, **Centralab BC Hi-Kaps.**
**C21, C22** — 600 µµfd., 500v., silvered mica.
**C29, C43, C48, C52**—100 µµfd., 500v., silvered mica.
**C31** — 200 µfd., 500v., mica.
**C41, C65, C59**—140 µµfd., air variable, **Hammarlund HF-140.**
**C42**—0.001 µfd., 500v., mica.
**C44**—100 µµfd., air variable, APC-type.
**C45**—35 µµfd., air variable, **Hammarlund.**
**C46, C47** — 300 µµfd., 500v., silvered mica.
**C55**—0.01 µfd., 500v., mica.
**C61**—0.001 µfd., 2000v., mica.
**C62**—325 µµfd., air variable.
**C63**—0.001 µfd., 1000v., mica.
**L1**—30 mh., slug tuned coil, **Stancor WD-5.**
**L2**—27 turns, #22 wire on **National XR-16** form.
**L3**—35 turns, #28 wire on **National XR-50.**
**L4**—24 turns, #22 wire on **National XR-50.**
**L5**—**Barker & Williamson** "Band-Hopper," Type 2A.
**L6**—**Barker & Williamson, Type BTEL**, bandswitching turrett.
**M**—0-300 ma. d.c., **Simpson.**
**R1, R5, R17**—500,000-ohm potentiometer, **IRE type Q.**
**R2, R6, R9, R16, R18**—1500 ohms, 1w.
**R3, R10, R20, R31, R42, R46, R56**—10,000 ohms, 2w.
**R4**—2.2 megohm, ½w.
**R7, R15, R19, R45**—47,000 ohms, 2w.
**R8, R14, R25, R26**—10,000 ohms, 1w.
**R11**—1.5 megohm, ½w.
**R12**—3000 ohms, 1w.
**R13, R23, R27, R28, R30, R32, R40, R47, R54**—100,000 ohms, ½w.
**R21**—2200 ohms, 1w.
**R22**—5000 ohms, ½w.
**R24** — 2000-ohm potentiometer, **IRC type Q.**
**R29, R41, R55** — 1000 ohms, 1w.
**R33**—10,000-ohm potentiometer, **IRC type Q.**
**R34**—30,000 ohms, ½w.
**R35, R43, R49, R53**—1000 ohms, ½w.
**R36**—1.0 megohm, ½w.
**R37, R50**—200 ohms, ½w.
**R38, R51**—22,000 ohms, ½w.
**R39, R52**—22,000 ohms, 2w.
**R44**—1000-ohm potentiometer, **IRC type Q.**
**R48**—10,000 ohms, ½w.
**R57, R58, R59, R62, R63, R66, R67**—100 ohms, 1w.
**R60**—6000 ohms, 10w., wire wound.
**R61**—100 ohms, 4w. (two, 200-ohm, 2-watt resistors in parallel).
**R64, R65**—47 ohms, 1w.
**RFC1, RFC5** — 2.5 mh., r-f choke.
**RFC2, RFC3**—1.0 mh., r-f choke.
**RFC4, RFC6, RFC7** — 6 turns, #22 enam. wound on resistors R59, R64 and R65.
**Ry1** — Three pole, DT, 10,000-ohm coil relay, **Automatic Electric Mfg. Co., type RL-45.**
**Sw1**—SPDT ceramic wafer switch.
**Sw2** — DPDT toggle switch.
**T1** — Line-to-grid transformer, **Merit A2924**, 500 ohms to 100,000 ohms, CT.
**T2, T3** — Plate-to-push-pull grids, **Stancor A-63C.**
**T4, T5**—455-kc. i-f transformer, **Miller** type 012-C1.
**V1, V2, V3, V4, V5—RCA** type 6SN7.
**V6—RCA** type 6H6.
**V7—RCA** type 6J5.
**V8, V10**—type 6SB7Y.
**V9—RCA** type 6SH7.
**V11—RCA** type 6AG7.
**V12—RCA** type 2E26.
**V13—RCA** type VR-105.
**V14, V15 — RCA** type 6146.
**Xtal-1** — 400-kc. crystal (see text).
**Xtal-2** — 500-kc. crystal (see text).
**Y1, Y2**—1N34 crystals.



NOTE—UNLESS SPECIFIED, RESISTORS ARE 1/2 WATT.

in the companion exciter. The only change here was enlarging the coupling condensers to 0.01 $\mu$fd. to accommodate the lowered operating frequency.

### The 50-kc. Oscillator

This oscillator circuit is of the self-excited type and was found quite stable for its purpose. A search was made for a suitable oscillator coil that would be readily available to the constructor. A television replacement "width" coil was decided upon. The slug-tuned coil had sufficient inductance range to tune with the available silvered-mica condensers. The coil chosen was the *Stancor WD-5* unit which has a secondary winding. It was thought at first that this extra winding might be used to feed the balanced modulator without using the phase inverter tube, but it was found that the impedance of the balancing control, *R24*, was so low as to stop the Colpitts oscillator circuit from operating. No special circuit precautions were taken. If the oscillator has a simultaneous parasitic oscillation along with the fundamental 50-kc. signal, a 2000-ohm resistor should be put in series with the grid lead of *V3a* right at the grid pin, *pin #1*. This should curb any tendency for parasitic instability.

### The Carrier Insertion Stage

This cathode follower stage is conventional and the only precaution that was taken was to use shielded wire to run from the cathode of *V3b* to the carrier insertion control, *R33*, and back to the signal grid of *V8*. This kept the 50-kc. signal from getting into speech or voice control channels. Should there happen to be too much 50-kc. signal getting into the VOX channel, the VOX relay will stay in the "transmitter-on" position despite the position of the *VOX-ON-OFF* switch, *Sw2*. This condition can be remedied by connecting a 1000-$\mu\mu$fd. mica condenser from *pin 4* of *V4b* to ground.

### The First Mixer

This stage, *V8*, is the conventional receiver-type of mixer circuit using a 6SB7Y tube. The output circuit, *T4*, is a *Miller type 12-C1* midget "K-tran" i-f transformer. By all means use an i-f transformer of this quality. The selectivity of the transformers, *T4* and *T5*, must be great enough to successfully eliminate the mixer injection signals at 400 and 500 kilocycles. These signals will be c-w signals that will appear at the transmitter output unless eliminated at this low-frequency level. The oscillator injection voltage should not be too high—a level of about 10 volts rms from *pin #5* of *V8* to ground should be sufficient.

If the builder is still plagued with the presence of the 50-kc. "off-frequency" signals after careful construction and adjustment, a third i-f transformer of the same type should be added to the circuit following *T5* and very loosely coupled to *T5* with a 5 or 10 $\mu\mu$fd. coupling condenser. The secondary of this added transformer should then be connected to the grid of *V10* through the voltage dividing network composed of *R47*, *R48*, and *R49*. The increased selectivity of this added i-f transformer will undoubtedly remedy the situation. There is sufficient chassis space on the present chassis lay-out to permit the mounting of an additional *Miller 12-C1* midget transformer beside *T5*.

Another way to eliminate this "off-frequency" signal trouble would be to use a balanced modulator instead of a single-ended mixer as shown. The *Burnell* filter, however, has a single-ended output circuit and a balance cannot be easily forced using this particular filter. A balanced modulator circuit using a pair of multi-grid tubes could have been used with the SSB signal fed in single-ended while the oscillator was fed in push-pull. The output circuit would then have to be a single-ended arrangement. A calculated gamble was taken with the circuit shown and it is felt that an attenuation of over 40 db. of the "off-frequency" signals at the signal grid of *V10* should be sufficient for the purpose. An additional i-f transformer as already mentioned should knock these spurious signals down by another 20 db.

### The Low-Frequency Crystal Oscillator

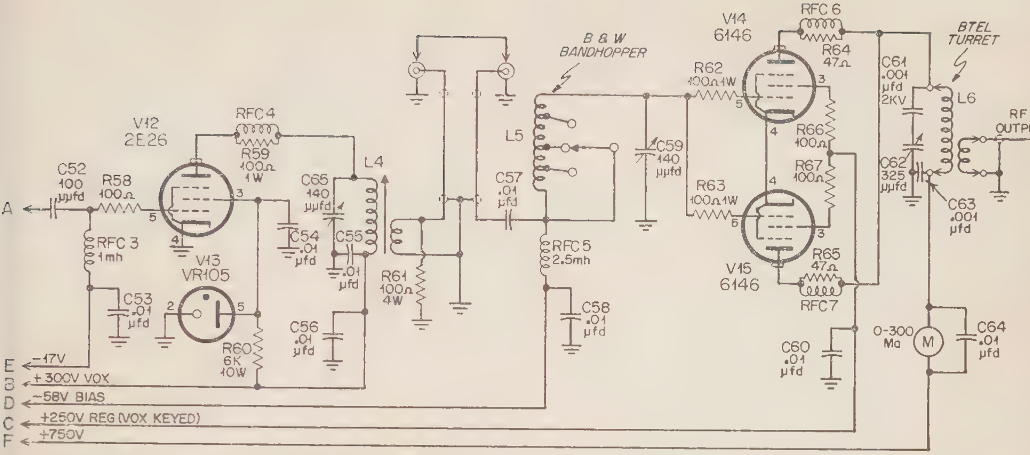
The sideband switch, *Sw-1*, selects the proper heterodyning crystal for upper and lower sideband operation. If the two crystals are not exactly 100 kilocycles apart the upper and lower sidebands (when the switch is thrown) will not be exactly "back-to-back"—that is the carrier frequency for the lower sideband will be slightly different than the carrier frequency of the upper sideband. This may be corrected by putting a small adjustable condenser from the grid-end of one of the crystals to ground. The proper capacity must be found by experimentation or careful measurement with a BC-221 frequency-meter. If the crystals are slightly over 100 kc. apart, the condenser should be connected to the 500 kilocycle crystal, and if the frequencies are a little under 100 kc. apart, the condenser should be connected to the 400-kc. crystal. The capacity should be increased slowly until the frequency comes to be exactly 100 kilocycles apart. All of this must be done after the 50-kc. oscillator has been carefully set on frequency.

### The I-F Amplifier

This stage is standard in most respects as conventional receiver techniques have been used. This stage may give a little trouble with self-oscillation. If this is the case, use heavy bypassing with large paper or electrolytic condensers from screen and cathode to ground. NOTE: Do *not* use resistor swamping of any of the i-f transformer windings to stabilize this stage. This will destroy the selectivity of the i-f transformers that is needed so badly.

### The Second Mixer

This stage, *V10*, is the final step of the double-heterodyne system. A 6SB7Y tube is again used in a conventional circuit. The signal input to the signal grid, *pin #8* of *V10*, must not exceed 0.25 volts peak value so the resistive voltage-divider



**This portion of the wiring schematic includes the two power amplifying stages of the SSB 75-watt exciter. The parts are included in the main listing on page 28. The jumper between the 2E26 and 6146 stages is used to couple to an external heterodyne unit which enables operation on other amateur bands.**

composed of *R47* and *R48* must be used to give an 11-to-1 reduction in output voltage of the preceding i-f amplifier. The total shunt resistance of the voltage divider is not low enough to harm the selective properties of *T5*.

The v-f-o signal voltage from *pin #5* of *V10* to ground should be adjusted to 10 volts by varying the size of the coupling condenser, *C43*, or changing the resistance of the screen resistor, *R56*, of the v.f.o.

## The V.F.O.

The familiar Clapp oscillator circuit with its remote tank circuit is used. For this particular exciter, a remote cable length of four feet was used. The added co-ax capacity apparently swamps the output to a certain extent and also changes the required tuning capacity. Pictures showing the constructional details of this remote box are shown.

## The 2E26 Stage

This stage operates straight through on 4.0 megacycles as class A or slightly into the class $AB_1$ region. The output circuit is "swamped" with the 100-ohm resistor, *R61*, so that any tendency toward oscillation will be eliminated. Be sure that this stage, as well as *all* stages, are completely stable and free of self-oscillation.

The output circuit of the 2E26 stages goes to the coaxial fitting on the rear of the chassis so that it may be connected to the external heterodyne unit for working bands other than 75 meters. For 75-meter operation the output is patched through to the grid input circuit of the power amplifier by using a short length of RG-58/U as a patchcord. Even though the output of the 2E26 is heavily loaded by *R61*, there is plenty of driving voltage at the grids of the following stage. The screen voltage is regulated by *V13* so that good linearity may be maintained under all signal input conditions.

## The 6146 Stage

This power amplifier stage uses two type 6146 tubes in parallel and is capable of 75 to 100 watts output. The grid tank circuit is identical to that used in the transmitter described in "SSB Techniques," i.e. the *B & W* "Bandhopper" is used as a bandswitching device and is coupled through the cold end of the coil to the link line from the 2E26 stage or from the heterodyne unit.

Two tubes are operated in parallel and the plate impedance will be lowered to half that of a single-tube final. Since the "40-meter" coil of the *BTEL* plate circuit turret was used on 75 meters, for a single tube, this same coil must be modified by removing sufficient turns to make the plate tank circuit tune with about 220 μμfd. for the 3.9 Mc. band. Since the tank tuning condenser has a straight-line wavelength plate configuration, and has a 325 μμfd. maximum capacity, the proper point for 75-meter tuning is about three-quarters fully-meshed. The higher frequency band coils must also be pruned so that 100 μμfd. is used for tuning on 40 meters with the nominal "20-meter" *BTEL* coil. Likewise the "15-meter" coil must be pruned so that about 50-μμfd. tuning capacity is used when operating on 20 meters. Absolutely no trouble was encountered in this stage with either fundamental-frequency oscillation or parasitic oscillation. The bias was set so that the idling plate current was 60 ma. and the stage performed just "like all the books say."

## The Voice Control System

This part of the exciter has largely been described in detail in *Chapter VIII*. The two-stage amplifier *V4a* and *V4b* raise the speech signal to a high level and apply it to one-half of a *6H6* tube through transformer *T3*. The diode rectifies the signal and the rectified voltage appears across

*(Continued on page 58)*

# DX and Overseas News

*Gathered and reported by*

**R. C. "Dick" Spenceley, KV4AA**

*Box 403, St. Thomas, Virgin Islands*

We welcome the following station to the HONOR ROLL:

***VE6MN 38-131***

HAPPY NEW YEAR, AND DX, TO ONE AND ALL!!

## VQ6LQ Off; Will Return in April

BRITISH SOMALILAND, VQ6LQ: As this is being read, Charley will be on a four-month leave in England. Upon his return, about April 3rd, he will be on the air again with redoubled energy. VQ6LQ's first contacts in each W district (October) were as follows: W1LZE, W2PRN (First W), W3JMN, W4CEN, W5MMK, W6RW, W7AH, W8OGV, W9FJY and W0NLY. First in Canada was VE1MF while G3KP was No. 1 in G-land. VQ6LQ ran 200 watts and was found near 14060 kc. Former calls held by Charley are: YI2RT, '30-'32; VU2NH/VU2DX, '32-'35; G3LQ, '38-'39; ZD1LQ, '48 and EL3LQ in '49.

## VS5KU and ZC3AC Active

BRUNEI, VS5KU: Activity from this station has been noted around 1230 GMT near 14050 kc. He is ex-G2KU and QSL's should go via RSGB. . . . CHRISTMAS ISLAND, ZC3AC: A report from ZL2FA confirms activity from this rare spot by working ZC3AC on 14160-kc. phone. 2FA says that 3AC is apparently a newcomer to Hamdom and requests that pile-ups be avoided so that he will not be 'frightened' off the air. Hm-m-m-m! QSL's should go via the VS1 Bureau.

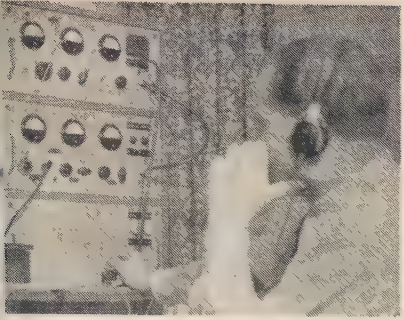
## Final Itinerary of G2RO

*PACIFIC ISLANDS, COCOS, G2RO: Bob's island tour is now under way and he was heard as VR2RO, in Fiji, from November 4 to 17. His appearance in Honiara, Solomon Islands, as VR4RO, was scheduled for November 22 to December 7. From December 15 to January 30 Bob is slated to be in the Gilbert and Ellice group as VR1RO. At this point he says that he will probably visit other islands and should be looked for between December 30 and January 12 at such spots (G2RO would like to hit the British Phoenix Islands and also Pitcairn Island, but chances look rather dim). After a stop in Sydney, January 30 to February 5, Bob will begin his homeward trip via Cocos, Mauritius and Kenya where he will be on the air for short periods as follows (the dates are approximate): Cocos, ZC2RO, February 6 to February 8; Mauritius, VQ8RO/VQ8AY, February 8 to February 12; Kenya, VQ4RO, February 12 to February 18. Home in London, February 20.*

## Look For Rodriguez and Afghanistan

RODRIGUEZ ISLAND, INDIAN OCEAN: This is a reminder that VQ8AL and VQ8AR had planned a ten to fifteen day trip to this spot sometime in January. We have received no further word, but advise you to keep your ears cocked. This island is some 330 miles east of Mauritius and might qualify as a "new" one. . . . AFGHANISTAN, YA: Bob, W1JRA, advises that he plans a three-month stay in Kabul, visiting his parents in the U.S. Embassy there, in about four months time. He is applying for a Ham ticket and, if things go as planned, Bob will have a 250-watt rig on the air and dispense those much needed YA contacts during his visit.

*Last Minute DX Flashes on Page 52*



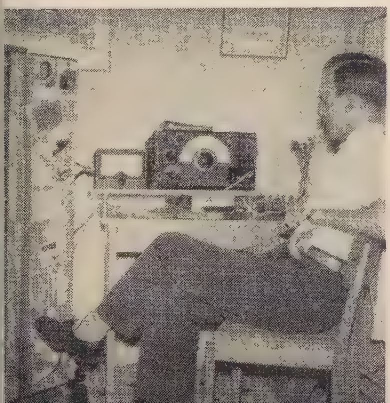
Vienna, Austria is well represented by Erwin Heitler, OE1ER, ex-OE1CD. Erwin is WAZ and has a country total of 223.

The two ops at HB1MX/HE between Sept. 1 and 6 were (l. to r.) Frank, OE1FF and Kurt, HB9MX. The potent signals came from a pair of 4-125A's modulated by 211's. This was pushed by a Collins v.f.o. The receiver was a CR-101.

Attending the annual meeting of the W9-DXCC'ers, Chicago, September 18th were: (Front row) W9ABB, W9QIY, W9NN, W9FID, W9FJY, W9JUV; (Second row) W9IU, W9VND, W9JJF, W9RHA, W9RBI, W9KXK, W9HUZ; (Standing) W9PNV, W9EWC, W9MZP, W9RKP, W9CFT, W9AMU, W9FDX, W9TKV, W9WFS, W9ESQ, W9PGW, W9JIP, W9RQM, W9GDI, W9KA, W9LI, W9UXO, W9IOD, W9GRV, W9LNM, W9AEH, W9FJB, W9YFV, W9GIL, W9DHT, W9WKU, W9ABA, W9FKC, W9TRD. Unable to attend were W9UM, W9VIN and W9PSR. The meeting was highlighted with talks by W9TRD on callbook publishing problems, two-meter beam demonstrations by W9PNV, functioning of the W9-QSL Bureau by W9CFT, DX talks by maestro W9RBI and emergency action by W9EWC who furnished ample quantities of delectable Wisconsin Cheddar Cheese.

(Photo courtesy CHICAGO TRIBUNE)

Operating position at SM6AJN, Boraas, Sweden with Rolf at the mike. One thousand volts on a single 813 results in a 200-watt signal. The receiver here is a British war surplus R1155A.



The signals of Arne, SM1BSA, Isle of Gotland, are very well-known. He does a commendable job filling in the SM1 prefix for the WASM certificate. One hundred twenty watts to a pair of 807's are in the metal cabinet. The familiar AR-88 is perched on the desk. Arne was stricken by polio in 1953 and currently navigates with a wheelchair. He is progressing and expects to be back as a Customs Officer (Stockholm Airport) next year. Arne is QRV daily around 14010 CW and 14150 phone. 175

## DX Notes

W7HXG reports **ZD9AB** on 14079 around 2100 GMT. . . . **CE0AC**, Dr. Verdugo, has now returned to Chile. CE0AC made few contacts due to difficulties with his electric plant. . . . The Chilean transport "Esmeralda" should now be back from Easter Island with the log of **CE0AD** and CE3AG will be able to answer the 300, or so, QSL's that have been received by the RCC for CE0AD. Ignacio, CE0AD, will continue to hand out contacts as time and gas supply permit. . . . Dave Laing, **VK2DE**, ex-ZC3AB, may be reached at 16 Rose Street, Chippendale, N.S.W., Australia. Dave states that he should turn up in YJ1-land in the not too distant future. . . . ZS2AT passes news that **FB8BK** works only on 7047 and he is pretty QRP. He can be found there on Sundays at 0700 GMT. . . . **VR1A** is active again on Tarawa as evidenced by QSO's with W2PRN and W2TVR, 1700 GMT, 14020. . . . F7BM (K2JCS) received QSL from **UB5CF**. . . . One **KD6AT** has been in evidence. He says QTH will be on his QSL (??). . . . **FY7YB** may be heard around 14030, 1100 GMT. Also, **FY7YE**, who sticks to 14061. . . . Via the *North California DX'er* we hear that **W6RRG** should now be in VP7 land for a year's stay. He also plans a trip to HI-land and advises that some of the boys in his group will make a quick trip to Ascension Island, ZD8, later on. . . . **W6MHB** plans on being at Cocos Island, TI9, around the 1st of February.

The following lucky ones contacted **VR2BZ/ZM7** during his August trip to Tokelau (*So. Cal. DX Bulletin*): W6NZW, W6AM, W6MUR, ZL1BY, ZL4JP, W6SYG, KL7PI, ZL1AH, W6CUQ, W6DIP, W6YY, W6LDD, W4KVX, W6EDJ, W9HUZ, KH6WU, W4TM, W4CEN, W6MBA, W6EBK, W0NWX, W6PYH, W6DZZ, W4TO, W6BUD, ZL1AJU, W6LW, W6AOA, W6MX, W6CYV, W6NTR, W6OYD, W6MHB, ZL1HY, W8ZY, KH6AVU, W6TZD, W9NDA, W6GIZ, W6WB, W6BAX, KV4AA, ZL2GX, ZL3JA, W6AWT, W6RW, W6ENV, W7KVU, W0AZT, W5MIS, W6VE, VE6VK and W0DXE.

## DX-ploits

Chas., **W1FH**, adding HK0EV and FO8AJ, reaches 257. . . . Andy, **W6ENV**, ups to 254 thanks to HK0AI and KC4AB and takes over the second place spot. . . . Don, **W6AM**, is also up there with HK0AI and KC4AB for a 251 total. . . . Steve, **W2BXA**, hits 248 with FO8AJ, HK0CV and KC4AB while Jim, **W8JIN**, lags just behind, with 247, adding KC4AB. . . . Jesse, **W3KT**, adds FO8AJ, MP4QAH and KC4AB for 246. Close behind is **G6RH** who reaches 245 thanks to LB8YB. . . . **W3JMN** goes to 239 with HK0EX and SV0WK/9 while Luis, **CE3AG**, submits FO8AJ and HK0GP to rest on 236. . . . Dewey, **W6VE**, rises to 231 with VQ6LQ, OY2Z and VP2GW. While Don, **W0PNQ**, comes up to date with 9S4AX, VR1G, FG7XA, FB8BB, EA9DD and FO8AJ to reach 224. . . . **OE1ER** (ex-OE1CD) arrives at 223 with such as SV0WK/9, MP4QAJ, ZP9AY, HR1AA and EA9DF. . . . **W6BUD** is now listed at 215 with LZ1KDP, FO8AJ, VK1HM, EA9AP, VS4RO, CN2AD and VR2BZ/ZM7 while **W7ENW** goes to 185 with VR3A, LB8YB and VK9YY. . . . **W6PCS** submits new list which raises him ten to 184. . . . **KV4AA** ups to 243 with KC4AB while Glenn, **W8KIA**, reaches 240 with same.

*With the best receiver and a good antenna*
*I tune around in a great dilemma*
*If I can't hear them, I can usually guess them*
*But where do I find this WSEM?*
**W6MUR**

Al, **W2WZ**, hits 238 with **ZC5RO**, SV0WK/9 and HK0AI as Ev, **KP4KD**, goes to 209 thanks to KC4AB and HI6TC. . . . Sergio, **CO2SW**, breaks the 200 barrier with a vengeance and makes it 208 with such as LU1ZT, ZD6BX, KC4AB, CE0AD, ZS9I, LU7ZM, ZS7C, VQ6LQ and CR5JB. . . . Lee, **VK3XO**, reaches 172 with ZC5RO, VS5RO, FB8XX, VK9RH, ZM6AL and VP8AA while Vern, **W7CNM**, gains a zone with VK1DY (Heard), and goes on to add FO8AJ, FB8XX, VS5RO, CE0AD, ZD9AB and ZM6AL for 171. . . . Pat, **W2GVZ**, advances to 182 with KC4AB while **F9AH** hits 165 thanks to PJ2AI. . . . Fritz, OE1FF, adds KC6CG, DU 7SV, VQ6LQ, EI2X FK8AL and CR9AF for 154. . . . Juan, **KP4CC**, rests o 197 with LU7ZM and VQ6LQ while **W0AIH** adds ZS7 for No. 176. . . . **W4EPA** makes it 162 with F9QV/FC an LU8ZS as Don, **W9WCE**, keyed with FY7YE, ZK1A VQ6LQ and CE0AD for 154. . . . **W6HJ** came up wit FA8DA, VP6PV, ZS9G, CE0AD, C3BF, JZ0KF, AG2A (Trieste), etc. to reach 116 and Bill, **KV4BB**, went to 18 with UB5KAB, VQ6LQ and KC4AB.

On the "phone only" side of the ledger HK0CV an FO8AJ put **W2BXA** on 204. **W6AM** miked with KC4A for No. 175. **W3JNN** went to 201 with SV0WK/9. **HC2J** reached 178 thanks to ZC5VR, HK0DE and KC4A **W3KT** came up to date with VQ3KIF, EA9DD, FO8A F8FW/FC and KC4AB to reach 169 on A3 while CS3A gave **W9WCE** his No. 126. . . . Frank, **VK2QL**, took 1 months to work over 100 at new QTH. . . . **W2GFW** naile VQ6LQ for No. 180 while Fred, **W5AVF**, snagged HK0A VQ6LQ and FY7YZ to hit 152. . . . Jim, **G6ZO**, nabbe CO2MO on 21 Mc. for No. 100 on that band. This give Jim DXCC on FIVE SEPARATE BANDS. . . . **W8K** finally completed WAC with JA8AQ. . . . **W1QGU** tune his 3.5-Mc. wire on 21 and his first contact was a ne country, ZS3K. . . . **LU5AQ** went to 175 with ZD6BX ZS9I, TF3MB, KB6AQ and KP6AG. . . . VQ6LQ was N 250 for **W3CRA**. . . . New ones at **W3UXX** wer OE13USA, SP9KAD and HA7OL while Paul, **K2GF** (ex-W6JKH), went to 144 with VU2EJ, YI2AM an VQ6LQ. . . . At W6TKX, 7 Mc. accounted for KR6AA HK4DP, VS6CW and CR6AC. During the contest Dic ran his 7-Mc. total to 92 with FK8AO, VS1FE an YV5DE. . . . George, **W7AHX**, went to 119 A3 and 17 CW with such as ZB1BF, OD5AV, YI2AM, LB8YB an EA9AP on 14 CW while A3 operation accounted fo TA3AA, ET2XX, CT1SX, LA5YE, OD5AB, etc., on th same band. 21-Mc. phone resulted in EL2X, ZS6DW OQ5RU, GW3CDT, ZB2A, KC6AA, to mention a few. . . **W5VIR** went to 75 on 21 Mc. with CR6BH. . . . **KP4K** made it 101 on 7 Mc. with KM6AX, VP2GW and EL2X . . . **CE3AG** rolled up 402,210 points in the recent contest . . . Some West Coast highs (Via W6AM) were: **W6BU** 260,000; **W6ITA**, 218,680; **W6YMD** (ex-W6JID) helped b W6AOA-W6OZ-W6KFV-K6BRW, 189,244; **W6AM** wit W6QMJ-W6KSF-W6BXL-W6GFE, 183,214 (All CW).

## NEW ADDRESSES

**CP3CA**——Box 593, Oruro, Bolivia.
**CT2AG**——Norberto, Airport de Santa Maria, Azores.
**FB8BR**——P.O. Box 730, Tananarive, Madagascar.
**FQ8AX**——Box 172, Pointe Noire, FEA.
**K4AGE** (ex-KP4UE)-Jim Merrell, Box 36, Shelby, Ala.
**KV4BK** (ex-W5RX)-Chas. Morenus, C.A.A., Box 61 Christiansted, St. Croix, V.I.
**LU7DJS**——Sadit Hector Penacini, J. M. Estrada 27 Lobos, FCNGR, Bs. As. Argentina.
**ST2NG**——L. D. Grant, Box 516, Khartoum, Sudan.
**VP2GW**——Box 108, Grenada, B.W.I.
**VP8BG**——Via W5GEL.
**VS5KU** (ex-G2KU)-Via RSGB.
**W1WY** (ex-W2WC)-Frank Anzalone, 14 Sherwood Roa Stamford, Conn.
**W5GRL** (ex-KP4YC)-Jim Potts, 2524 University Dr., For Worth, Tex.
**ZM6AL**——Ernest H. Betham, c/o Radio Station, Apia Western Samoa.

**Thanks to W6GMF, W2FJH and the West Gulf Bulleti**

## 160 Meters

**TI2BX** went to 1830 kc. on Oct. 24th and immediatel nabbed W4VNE, W3EIS, W2GGL, W9PNE, W2EQS an W3RGQ. All averaging 589. . . . In October **W1BB** pulle in G6GM, G3PU and numerous W's. **W2EQS** has nabbe G6GM. . . . **G6GM** needs VP4LZ to complete his top-ban WAC. JANUARY TRANSATLANTIC TESTS, 0500-080 GMT, ON THE SECOND, SIXTEENTH AND THIRTIETH.

*(Continued on page 66)*

# WAZ Honor Roll

| CW AND PHONE | |
|---|---|
| W1FH | 257 |
| W6ENV | 254 |
| W0YXO | 252 |
| W8HGW | 251 |
| W6VFR | 251 |
| W6AM | 251 |
| PY2CK | 248 |
| G6ZO | 248 |
| W6MEK | 248 |
| W2BXA | 248 |
| W6SN | 247 |
| W6SYG | 247 |
| W8JIN | 247 |
| W3BES | 246 |
| W8PQQ | 246 |
| W3KT | 246 |
| G6RH | 245 |
| W2AGW | 244 |
| W9NDA | 244 |
| W3GHD | 243 |
| W6MX | 243 |
| W8NBK | 242 |
| W8BHW | 242 |
| W3EVW | 241 |
| W6ADP | 241 |
| W3JTC | 240 |
| VE4RO | 240 |
| W3GAU | 239 |
| W6DZZ | 239 |
| W3JNN | 239 |
| W6GRL | 237 |
| W6MEK | 236 |
| CE3AG | 236 |
| W3CPV | 235 |
| W7AMX | 235 |
| LU6DJX | 234 |
| W6AMA | 233 |
| SM5LL | 233 |
| W6GDJ | 233 |
| G2LB | 232 |
| G4CP | 232 |
| W7DL | 232 |
| W6VE | 231 |
| W7GUI | 229 |
| W7BD | 229 |
| W8BRA | 228 |
| ZL2GX | 228 |
| W6EBG | 227 |
| W6PFD | 226 |
| VK2ACX | 226 |
| W6TS | 225 |
| W6SAI | 224 |
| W6TI | 224 |
| W0PNQ | 224 |
| L1FF | 223 |
| VK3BZ | 223 |
| E1ER | 223 |
| W3LOE | 222 |
| W6FSJ | 222 |
| W3BHV | 222 |
| W6DLY | 222 |
| W6MVQ | 221 |
| W6PB | 221 |
| G6QB | 221 |
| SM5KP | 220 |
| W6CYI | 220 |
| W6ITA | 219 |
| W6EFM | 219 |
| W6TT | 218 |
| W0NUC | 218 |
| W6PQT | 218 |
| G2PL | 218 |
| KH6IJ | 218 |
| W0DU | 218 |
| W6PKO | 218 |
| W9DUY | 217 |
| W2PEO | 215 |
| W6BUD | 215 |
| W3IYE | 214 |
| PY1DM | 214 |
| S2X | 214 |
| KH6BA | 214 |
| L1BY | 214 |
| W6EPZ | 214 |
| W6OEG | 213 |
| W4AIT | 213 |
| KH6CT | 213 |
| VK4HR | 213 |
| W6RBQ | 213 |
| E3DZ | 213 |
| PY1AHL | 213 |
| W6HX | 212 |
| VE7HC | 212 |
| G8IG | 212 |
| W5GEL | 212 |
| W6NNV | 211 |
| W6BPD | 210 |
| W6MJB | 210 |
| W6IBD | 210 |
| W9VW | 209 |
| W6RW | 209 |
| W6UHA | 209 |
| W2AQW | 208 |
| L1HY | 208 |
| W6SC | 207 |
| VE7VM | 206 |
| W4BPD | 206 |
| W0ELA | 206 |
| W6SR | 206 |
| W6ERI | 205 |
| W6ZCY | 204 |

| CW AND PHONE | |
|---|---|
| W6DI | 204 |
| VK2DI | 204 |
| W6AVM | 204 |
| DL7AA | 204 |
| W4CYU | 203 |
| W6HJT | 203 |
| LU8EN | 203 |
| W6RM | 202 |
| W6OMC | 202 |
| W6AOA | 202 |
| G2MI | 202 |
| G3DO | 200 |
| W9KOK | 200 |
| VK5JS | 200 |
| W7OY | 200 |
| W6MHB | 200 |
| ON4QF | 200 |
| VK3KB | 200 |
| PY1GJ | 199 |
| W6RLN | 198 |
| W6SRF | 198 |
| W6UCX | 198 |
| W2IOP | 197 |
| KH6QH | 197 |
| W6BAX | 197 |
| PY1AJ | 196 |
| W6WB | 196 |
| G2FSR | 196 |
| I1KN | 196 |
| W6LW | 196 |
| W5KC | 195 |
| OK1FF | 194 |
| W6NTR | 194 |
| W6GAL | 193 |
| W6EHV | 193 |
| W0SQO | 192 |
| W6NGA | 192 |
| W6WWQ | 192 |
| VK2NS | 191 |
| W6SRU | 190 |
| VK3JE | 189 |
| ON4JW | 189 |
| W0NTA | 188 |
| W8SDR | 186 |
| VK6RU | 186 |
| W6DFY | 186 |
| W4CYY | 186 |
| W2CZO | 185 |
| W1AB | 185 |
| W6IFW | 185 |
| W7ENW | 185 |
| W6SA | 184 |
| KH6VP | 184 |
| W6LRU | 184 |
| W6PCS | 184 |
| W2JVU | 183 |
| DL1IB | 183 |
| LA7Y | 182 |
| VK4EL | 182 |
| W6LN | 181 |
| PY1BG | 179 |
| W9VND | 178 |
| W0UOX | 177 |
| VE6KW | 177 |
| W6UZX | 177 |
| CX1FY | 176 |
| KH6CD | 176 |
| W6LDD | 176 |
| PK4DA | 175 |
| W8HUD | 175 |
| W6WKU | 174 |
| W6CIS | 174 |
| W7FZA | 174 |
| W6KUT | 174 |
| W6TZD | 173 |
| W6JK | 173 |
| G5YV | 172 |
| OK1LM | 172 |
| OK1HI | 171 |
| ZS2AT | 171 |
| W6BAM | 170 |
| DL1AB | 170 |
| W6PZ | 170 |
| W5AFX | 169 |
| G2VD | 169 |
| W6JZP | 168 |
| W6ANN | 167 |
| VK3CN | 167 |
| W6BVM | 167 |
| I1XK | 167 |
| W6ATO | 167 |
| W6DUC | 166 |
| KH6MI | 166 |
| W6CEM | 166 |
| VE7GI | 165 |
| W6RZE | 165 |
| W6PM | 164 |
| ZS6A | 164 |
| W6EAK | 165 |
| W6YZU | 165 |
| G5GK | 163 |
| VE7VO | 162 |
| ZS6DW | 162 |
| I1IR | 162 |
| W6PDB | 161 |
| OK1SV | 160 |
| VE3EK | 160 |
| W6UPY | 160 |
| JA2KG | 160 |
| KH6MG | 160 |
| W6ONZ | 160 |

| CW AND PHONE | |
|---|---|
| W0FFV | 158 |
| W0OUH | 157 |
| G3TK | 157 |
| W6BUY | 157 |
| W6QD | 157 |
| ZS6FN | 157 |
| OH5NK | 157 |
| W7BE | 156 |
| KH6IG | 156 |
| DL1DC | 155 |
| W6BUO | 155 |
| VK5KO | 155 |
| G3AAM | 154 |
| G2IO | 154 |
| W6RLQ | 154 |
| W6KEV | 153 |
| OK1RW | 153 |
| W6FHW | 153 |
| G3YF | 152 |
| KP6AA | 152 |
| W6ID | 152 |
| VK2QL | 151 |
| VK2AM | 151 |
| W6LEE | 150 |
| W6FHE | 150 |
| W6EYR | 150 |
| W6LER | 150 |
| W6NZ | 148 |
| OK1CX | 147 |
| W6LS | 147 |
| W7KMC | 147 |
| KH6PY | 147 |
| W7DXZ | 146 |
| W6AYZ | 146 |
| VE6GD | 146 |
| VS6AE | 146 |
| W9NRB | 145 |
| W6MUC | 145 |
| OK2SO | 145 |
| ON4TA | 144 |
| G3BI | 144 |
| W6BIL | 144 |
| W7LYL | 143 |
| KG6GD | 143 |
| W3IXN | 141 |
| W6AOD | 140 |
| VK2PV | 140 |
| ZC1CL | 138 |
| OK1WX | 135 |
| W7BTH | 135 |
| G3AZ | 133 |
| W6TEU | 133 |
| W6RDR | 133 |
| W6AUT | 133 |
| VE7KC | 133 |
| W6OBD | 131 |
| ZS2CR | 131 |
| CR9AH | 131 |
| W6IDZ | 130 |
| W7ASG | 129 |
| W7GBW | 127 |
| G8IP | 127 |
| G5BJ | 126 |
| VK6SA | 126 |
| PK6HA | 124 |
| G5VU | 124 |
| W6NRQ | 123 |
| W6MLY | 123 |
| ZL1GX | 122 |
| VK5MF | 121 |
| ZL2CU | 120 |
| ZS2EC | 116 |
| ZS6CT | 113 |
| W7KWA | 98 |
| W6DUB | 89 |
| W7IYA | 59 |

### 39 ZONES

| | |
|---|---|
| KV4AA | 243 |
| W5ASG | 240 |
| W8KIA | 240 |
| W2WZ | 238 |
| W1CLX | 234 |
| F8BS | 232 |
| W2NSZ | 232 |
| W9RBI | 230 |
| W3DPA | 230 |
| W3EPV | 229 |
| W8DMD | 225 |
| W1ENE | 225 |
| 4X4RE | 224 |
| W3OCU | 224 |
| W2QHH | 224 |
| W9LNM | 221 |
| W1BIH | 221 |
| W1GKK | 219 |
| W1JYH | 219 |
| W1HX | 218 |
| W9FKC | 216 |
| W9HUZ | 216 |
| W3DRD | 211 |
| W5MPG | 211 |
| W5FFW | 211 |
| W4GG | 211 |
| W2BJ | 211 |
| W3DKT | 210 |
| VK4FJ | 210 |
| W5LVD | 209 |
| W8SYC | 209 |
| KP4KD | 209 |
| W2HHF | 208 |
| CO2SW | 208 |

| CW AND PHONE | |
|---|---|
| W8HFE | 207 |
| VE3QD | 206 |
| W1ZL | 205 |
| W4LVV | 205 |
| F9BO | 204 |
| W3KDP | 203 |
| W9IU | 201 |
| W2HZY | 200 |
| W3JKO | 200 |
| W2EMW | 198 |
| W4RBQ | 198 |
| W9MXX | 197 |
| W7PGS | 197 |
| W6GPB | 197 |
| SM5WI | 196 |
| W2CWE | 192 |
| VE3AAZ | 192 |
| W2IMU | 192 |
| W2AGO | 191 |
| W1AWX | 191 |
| OK1VW | 190 |
| GM3CSM | 190 |
| OE3CC | 189 |
| W0EYR | 186 |
| VE3IJ | 186 |
| W8RDZ | 184 |
| W9TQL | 184 |
| W4INL | 183 |
| W2MEL | 183 |
| W1DQM | 181 |
| W2CNT | 181 |
| G3FXB | 181 |
| W2RDK | 180 |
| W4AZK | 180 |
| VO6EP | 179 |
| VK4DO | 179 |
| W9ABA | 179 |
| VE8AW | 178 |
| W2RGV | 178 |
| W8VLK | 177 |
| W8CVU | 172 |
| W4DKA | 172 |
| VK3XO | 172 |
| W4VE | 171 |
| W7CNM | 171 |
| W9LM | 170 |
| KL7PI | 170 |
| W6CTL | 169 |
| W1NMP | 169 |
| W3JTK | 169 |
| OZ7EU | 169 |
| HC2OT | 169 |
| PY2AC | 168 |
| W6LGD | 168 |
| W2CYS | 167 |
| W8LEC | 166 |
| W6WO | 166 |
| SM7MS | 164 |
| W4BRB | 162 |
| G6QX | 162 |
| W9NZZ | 160 |
| W4OM | 158 |
| SM7QY | 158 |
| W6KYV | 158 |
| W0AIW | 157 |
| I1AY | 157 |
| W8WWU | 157 |
| W0RBA | 157 |
| DL1AT | 156 |
| W9YNB | 155 |
| DL1FK | 155 |
| I1AIV | 154 |
| DL1KB | 154 |
| W6CUL | 154 |
| G3AKU | 150 |
| VE7VC | 150 |
| W1ZD | 150 |
| W2GUR | 146 |
| W6CAE | 146 |
| TF3SF | 145 |
| OK1AB | 144 |
| W6MUF | 144 |
| TF3EA | 142 |
| VS7NX | 140 |
| W6KYT | 135 |
| W7HXG | 134 |
| W7ETK | 132 |
| W9ALI | 132 |
| W6TE | 131 |
| W6WJX | 131 |
| W5CPI | 130 |
| KL7UM | 129 |
| DL1DA | 127 |
| W6EYC | 126 |
| VR5PL | 124 |
| DL3DU | 118 |
| W6NRZ | 117 |
| W6JWL | 114 |
| W6FBC | 114 |
| W6VAT | 110 |
| DL3AB | 107 |
| W7GXA | 105 |
| W6LEV | 103 |
| W6FXL | 93 |
| W7LEE | 91 |

### 38 ZONES

| | |
|---|---|
| TI2TG | 221 |
| PY4IE | 215 |
| W2HMJ | 206 |
| W1HA | 205 |
| GM3EST | 202 |

| CW AND PHONE | |
|---|---|
| W8KPL | 188 |
| W0TKX | 187 |
| W5KUJ | 187 |
| W2GVZ | 182 |
| W2PUD | 181 |
| W2SHZ | 180 |
| W8FJN | 173 |
| W8EYE | 172 |
| W3FYS | 172 |
| W1BFT | 166 |
| GM2UU | 165 |
| F9AH | 165 |
| VE2BV | 163 |
| W6TXL | 161 |
| I1UV | 160 |
| ZL3CC | 159 |
| W3LVJ | 157 |
| W2UEI | 156 |
| LU7CD | 155 |
| OE1FF | 154 |
| DL1YA | 153 |
| W4LQN | 152 |
| W5MET | 150 |
| ZL4DO | 147 |
| W6ETJ | 144 |
| W8ZMC | 143 |
| W0AZT | 143 |
| ZL3AB | 143 |
| W9FKH | 135 |
| MP4BAD | 135 |
| W4FPK | 131 |
| VE6MN | 131 |
| W2PQJ | 130 |
| W3ZN | 129 |
| EA1AB | 129 |
| W9MZP | 126 |
| FE8AB | 126 |
| W9TB | 122 |
| GW4CX | 120 |
| W0FET | 118 |
| KL7PJ | 117 |
| W7EYS | 107 |
| VK6DX | 103 |
| C1CH | 84 |

### 37 ZONES

| | |
|---|---|
| W6KYG | 200 |
| KP4CC | 197 |
| W1KFV | 177 |
| OZ7BG | 174 |
| W2OST | 169 |
| W3WU | 162 |
| W4EPA | 162 |
| VE3LJ | 161 |
| W2ZA | 160 |
| IS1AHK | 160 |
| W2WC | 158 |
| W9WCE | 154 |
| W9LI | 151 |
| W4IWO | 149 |
| W6YK | 144 |
| W4ML | 140 |
| ZL1QW | 138 |
| W1APA | 138 |
| W2AYJ | 133 |
| W7HKT | 130 |
| W1DIA | 129 |
| VE5JV | 126 |
| W9LNH | 122 |
| OH3OE | 118 |
| W6YX | 117 |
| VE1EA | 116 |
| G3BPP | 112 |
| W6AX | 110 |
| W0FFW | 108 |
| W7PK | 104 |
| W8HSW | 104 |
| W2BLS | 99 |
| W6WWW | 99 |
| KL7KV | 88 |

### 36 ZONES

| | |
|---|---|
| W5JUF | 206 |
| W4HA | 182 |
| W0AIH | 176 |
| W2ZVS | 169 |
| GM2DBX | 165 |
| W3AXT | 156 |
| W3AYS | 151 |
| W3MZE | 150 |
| I1IT | 140 |
| W0CU | 139 |
| F9RS | 139 |
| OA4AK | 128 |
| VE1PQ | 128 |
| I1IZ | 128 |
| F8TM | 124 |
| W2BF | 115 |
| 4X4BX | 112 |
| W5CD | 108 |
| W2JA | 102 |

### 35 ZONES

| | |
|---|---|
| KV4BB | 185 |
| KG4AF | 182 |
| W5FXN | 169 |
| W1DEP | 159 |
| W1RAN | 150 |
| W2AZS | 142 |
| W6ZZ | 135 |
| W4DHZ | 132 |
| W9CKP | 132 |

| CW AND PHONE | |
|---|---|
| W1MRP | 130 |
| W5AWT | 125 |
| OE5YL | 122 |
| ZL3CP | 121 |
| W9RQM | 119 |
| CO6AJ | 119 |
| W0GBJ | 116 |
| W6HJ | 116 |
| W9GDA | 115 |
| W9FNR | 114 |
| W8AVB | 113 |
| I1ER | 112 |
| KZ5IP | 108 |
| KL7CZ | 80 |

## Phone Only

### WAZ

| | |
|---|---|
| VQ4ERR | 223 |

### 39 ZONES

| | |
|---|---|
| PY2CK | 228 |
| XE1AC | 217 |
| W3LTU | 206 |
| W6DI | 203 |
| G8IG | 188 |
| W6VFR | 181 |
| PK4DA | 175 |
| W7HTS | 161 |
| W8HUD | 161 |
| F9BO | 158 |
| VE7ZM | 145 |
| DL1FK | 125 |

### 38 ZONES

| | |
|---|---|
| W2BXA | 204 |
| W9NDA | 203 |
| W9RBI | 202 |
| SM5KP | 199 |
| W6AM | 175 |
| W6KQY | 171 |
| W4CYU | 160 |
| ZL1HY | 157 |
| W1HKK | 153 |

### 37 ZONES

| | |
|---|---|
| W3JNN | 201 |
| ZS6Q | 192 |
| W3BES | 190 |
| W1JCX | 189 |
| CE3AB | 186 |
| W8BF | 183 |
| W3GHD | 181 |
| W8REU | 176 |
| G3DO | 175 |
| VK3BZ | 173 |
| W7MBX | 164 |
| W9HB | 161 |
| W6PXH | 159 |
| GM2UU | 158 |
| W6WNH | 157 |
| W6TT | 145 |
| W0HX | 143 |
| F8VC | 124 |
| W7MBW | 112 |
| C1CH | 83 |

### 36 ZONES

| | |
|---|---|
| W1MCW | 216 |
| W1NWO | 206 |
| TI2TG | 182 |
| W1BEQ | 164 |
| GM2DBX | 163 |
| W4ESP | 159 |
| W2DYR | 140 |
| W9BZB | 139 |
| W9HP | 139 |
| W8AUP | 131 |
| W8PDB | 130 |
| VE3BNQ | 130 |
| W4INL | 129 |
| W1FJN | 128 |
| G6BW | 127 |
| VE7HC | 123 |
| W8CYL | 112 |
| W3DHM | 96 |
| W6SA | 92 |
| F8DC | 87 |

### 35 ZONES

| | |
|---|---|
| HC2JR | 178 |
| W4HA | 173 |
| W5ASG | 173 |
| W5JUF | 171 |
| W3EVW | 166 |
| W0NCG | 161 |
| W9RNX | 155 |
| W6PCK | 152 |
| W9BVX | 148 |
| W2RGV | 148 |
| W0ANF | 142 |
| PY2JU | 140 |
| W2GHV | 137 |
| W6CHV | 135 |
| W0PUE | 135 |
| HC2OT | 134 |
| W0EYR | 131 |
| W0PRZ | 124 |
| W9CKP | 124 |
| G8QX | 123 |
| W8ZMC | 122 |
| W6YX | 110 |

## ALL TIMES IN E S T

| EASTERN USA TO: | 15 Meters | 20 Meters | 40 Meters | 80 Meters |
|---|---|---|---|---|
| Northern & Central Europe | 0800-1130 (2-3) | 0600-0730 (1-2)<br>0730-1230 (3-4)<br>1230-1500 (2) | 1500-1600 (2-3)<br>1600-1900 (3-4)<br>1900-0500 (2) | 1700-2000 (2-3)<br>2000-0300 (3-4) |
| Southern Europe & North Africa | 0700-1230 (3) | 0600-0730 (1-2)<br>0730-1330 (3-4)<br>1330-1500 (2) | 1530-1630 (2)<br>1630-1930 (3-4)<br>1930-0500 (2-3) | 1700-2000 (3)<br>2000-0300 (3-4) |
| Near & Middle East | 0700-1030 (1-2) | 0630-1230 (2-3) | 1630-1900 (3)<br>1900-0000 (2) | 1800-2300 (2) |
| Central & South Africa | 0900-1200 (1)*<br>0800-1130 (1-2)<br>1130-1400 (3) | 0630-1300 (1)<br>1300-1700 (2-3) | 1730-0100 (2) | 1830-2330 (1-2) |
| South America | 1100-1500 (0-1)*<br>0800-1430 (2-3)<br>1430-1600 (3-4) | 0630-1500 (3)<br>1500-1700 (4-5)<br>1700-0200 (1-2) | 1730-0400 (3-4)<br>0400-0700 (2-3) | 1900-0400 (2-3) |
| South East Asia | Nil | 0700-0900 (0-1)<br>1700-1900 (0-1) | 0300-0800 (0-1) | Nil |
| Australasia | 0600-0800 (0-1)<br>1600-1800 (1) | 0700-0930 (2)<br>0930-1930 (1) | 0100-0300 (2)<br>0300-0630 (1)<br>0630-0800 (2-3) | 0200-0700 (2) |
| Guam & Pacific | 1600-1800 (1) | 0630-1000 (1)<br>1500-1900 (1) | 0000-0730 (2-3) | 0100-0600 (1-2) |
| Japan & Far East | Nil | 0630-0830 (1)<br>1600-1800 (1) | 0300-0800 (1) | 0400-0700 (0-1) |

## ALL TIMES IN C S T

| CENTRAL USA TO: | 15 Meters | 20 Meters | 40 Meters | 80 Meters |
|---|---|---|---|---|
| Western & Central Europe | 0800-1030 (1-2) | 0600-0730 (1-2)<br>0730-1130 (3)<br>1130-1400 (1) | 1500-1600 (1-2)<br>1600-1800 (3)<br>1800-0400 (1-2) | 1700-0200 (2-3) |
| Southern Europe & North Africa | 0800-1200 (2) | 0600-0730 (1-2)<br>0730-1230 (3-4)<br>1230-1430 (1-2) | 1500-1800 (3)<br>1800-0430 (2) | 1730-0200 (2-3) |
| Central & South Africa | 0900-1200 (1)*<br>0800-1200 (2)<br>1200-1330 (3) | 0600-1300 (1)<br>1300-1600 (2-3) | 1700-0030 (2) | 1830-2300 (1-2) |
| Central America & Northern South America | 0900-1400 (1)*<br>0830-1400 (4)<br>1400-1600 (1-2) | 0630-0900 (3-4)<br>0900-1430 (2)<br>1430-1700 (4)<br>1700-0300 (2) | 1600-0500 (4)<br>0500-0800 (2-3) | 1730-0500 (3) |
| South America | 1100-1400 (1)*<br>0800-1600 (3-4) | 0600-0800 (3)<br>0800-1500 (2)<br>1500-1730 (4)<br>1730-0030 (2) | 1800-0430 (3) | 1830-0400 (2) |
| Japan & Far East | 1600-1800 (0-1) | 0700-0900 (1)<br>1500-1930 (2) | 2200-0800 (1-2) | 0230-0700 (1-2) |
| South East Asia | 1700-1900 (0-1) | 0700-0900 (0-1)<br>1600-1830 (1) | 0200-0730 (1) | Nil |

## ALL TIMES IN C S T

| CENTRAL USA TO: | 15 Meters | 20 Meters | 40 Meters | 80 Meters |
|---|---|---|---|---|
| Hawaii | 1200-1700 (2-3) | 1000-1200 (3-4)<br>1200-2000 (2-3) | 2100-0830 (3-4) | 2200-0700 (3) |
| Australasia | 0630-0800 (0-1)<br>1600-1800 (1-2) | 0700-1000 (2)<br>1000-1800 (1)<br>1800-1930 (1-2) | 0100-0730 (2-3) | 0300-0630 (2) |

## ALL TIMES IN P S T

| WESTERN USA TO: | 15 Meters | 20 Meters | 40 Meters | 80 Meters |
|---|---|---|---|---|
| Europe & North Africa | 0730-0930 (0-1) | 0700-1000 (2) | 1600-0400 (1) | 1700-2330 (1) |
| Central & South Africa | 0900-1230 (1)<br>1230-1400 (2) | 0600-1300 (1)<br>1300-1730 (2) | 1630-2200 (2-3) | 1830-2100 (1) |
| South America | 1000-1300 (1)*<br>0800-1330 (2-3)<br>1330-1500 (3-4) | 0600-0800 (3)<br>0800-1400 (1-2)<br>1800-0230 (1-2) | 1700-0000 (3-4)<br>0000-0400 (2-3) | 1800-0300 (2) |
| Guam & Mariana Islands | 1300-1600 (1)*<br>1230-1800 (3-4) | 1100-1230 (2-3)<br>1230-1730 (1-2)<br>1730-2000 (2-3) | 2330-0800 (3) | 0030-0700 (2) |
| Australasia | 1500-1700 (0-1)*<br>1300-1730 (2-3) | 0700-0900 (1)<br>0900-1100 (2)<br>1100-1730 (1)<br>1730-2000 (2) | 2300-0700 (2-3) | 0030-0630 (1-2) |
| Japan, Okinawa & Far East | 1430-1730 (2-3) | 1330-1730 (3)<br>1730-1900 (3-4)<br>1900-2030 (2) | 2100-0830 (3-4) | 2200-0700 (3) |
| Philippine Islands & East Indies | 1500-1800 (2-3) | 1400-2000 (1-2) | 0200-0700 (1-2) | 0300-0630 (1) |
| Malaya & South East Asia | 1600-1800 (0-1) | 1530-1930 (1-2) | 0300-0700 (1-2) | 0400-0600 (1) |
| Hong Kong, Macao & Formosa | 1500-1730 (2) | 1430-1730 (2)<br>1730-1900 (3) | 2330-0730 (3) | 0030-0630 (2) |

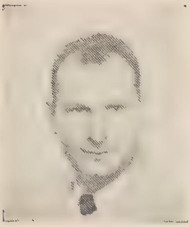
Symbols for Expected Percentage of Days of Month Path Open:

(0) None (1) 10% (2) 25% (3) 50% (4) 70% (5) 85% or more.

* Indicates time of possible ten-meter openings.

The CQ Propagation Charts are based upon a CW radiated power of 150 watts and are centered on Washington, D. C., St. Louis, Missouri and Sacramento, California. These forecasts are, for the most part, calculated from basic ionospheric data published by the CRPL of the National Bureau of Standards, and are valid until February 15th 1955.

# Ionospheric Propagation Conditions



Forecasts by

**George Jacobs, W2PAJ/3**

*607 Beacon Road, Silver Spring, Md.*

## General Propagation Conditions — January

**6 Meters:** Not much in the way of ionospheric propagation expected on this band.

**10 Meters:** DX generally poor, with erratic daylight openings possible on some north-south paths during periods of exceptionally good propagation conditions.

**15 Meters:** Fair, or better, world-wide DX conditions and considerable short skip expected during the daylight hours.

**20 Meters:** Conditions should be very similar to December with fair to good DX from shortly after sunrise to shortly after sunset. Exceptionally strong signals can be expected during periods of good propagation conditions as ionospheric absorption is at a minimum on many paths.

**40 Meters:** Fair to good late afternoon and evening world-wide DX continues with the band generally quiet and signals quite strong.

**80 Meters:** Generally fair DX conditions continue to many areas of the world from a few hours after sunset to a few hours before sunrise. This band will generally remain open to many areas after 40-meters has faded out.

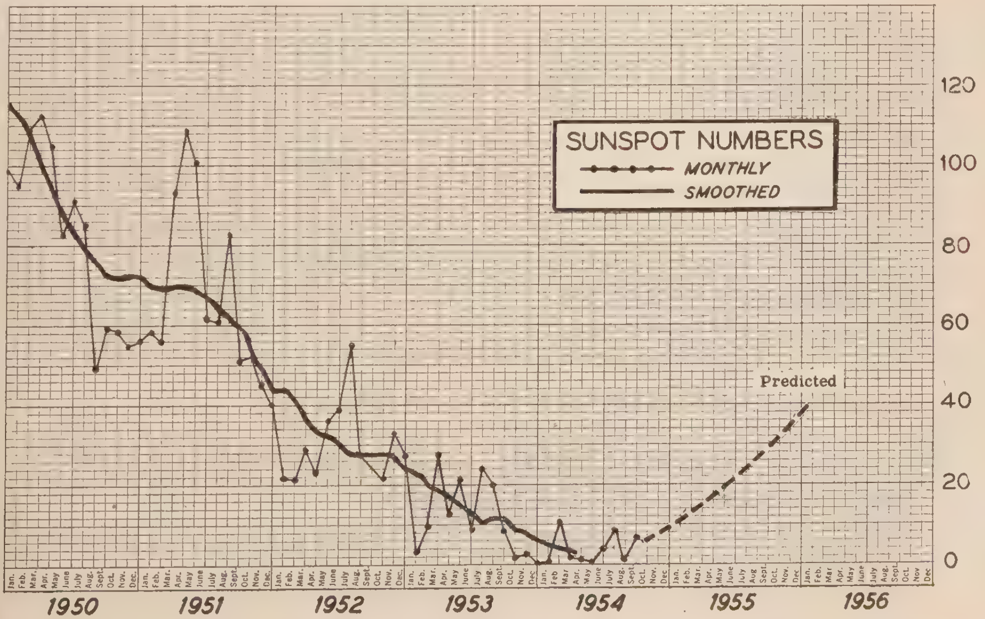
**60 Meters:** Conditions quite similar to those observed during December are expected during January. Seasonal low absorption and atmospheric noise levels (in the Northern Hemisphere) should result in fairly strong night-time signals on some DX paths.

## 1954 In Review

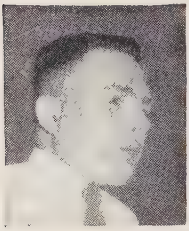
Although final observations have not yet been completed, it now appears certain that 1954 was the end of the 18th sunspot cycle and the year in which the 19th sunspot cycle began. It looks as though the actual minimum of the 18th cycle occurred during the late spring of 1954. This is quite a significant scientific event in that since the discovery of the ionosphere (and the birth of short wave radio) in 1924, there have been only two other similar periods of minimum solar activity—in 1933 and 1944. During the minimum of 1933 some investigations were made of short wave radio conditions but this stage of the art was only beginning and many questions remained to be answered. During the next minimum of 1944, war-time conditions made it impossible to conduct world-wide ionospheric studies. So in reality the minimum of 1954 is the first when conditions were suitable for the investigation of effects of minimum solar activity upon short wave radio transmission. There is little doubt that scientific data collected during 1954 may eventually lead to a better understanding of the ionosphere and the mechanism of short wave radio propagation.

This year will be most significant to radio amateurs. Associated with the rise in solar activity there will be a general improvement in short wave propagation conditions on 15 and 10 meters. The ascending portion of the sunspot cycle is considerably steeper than the decreasing part and while the initial rise is slow——once the numbers start going up they usually go up quite fast. At the

(Continued on page 52)



# the Novice Shack



*Conducted by*

***Herbert "Herb" S. Brier, W9EGQ***

*385 Johnson St., Gary 3, Indiana*

Probably the biggest ambition of most newly licensed amateurs is to work all 48 states.

Working all states (WAS) within a year or less is a real achievement for any amateur. It is especially noteworthy when it is done by a Novice. To mention just two reasons, interference (QRM) in the Novice bands is far worse than in the other CW bands and the ones he must work have low-powered transmitters (averaging 30 to 35 watts), plus receivers that are seldom the best obtainable.

To overcome these handicaps requires operating skill and intelligence, combined with loads of patience.

When you first get on the air, almost every contact you make represents a new state, but soon the new ones start coming hard. At this time, you must decide whether you will have more fun making lots of contacts with stations as they come along, allowing your states-worked total to take care of itself, or whether you want to concentrate on adding new states to your list.

If you choose the latter course, be prepared to do a lot of listening, *Call Book* thumbing and comparatively little transmitting to achieve your goal. Furthermore, the closer you come to it, the more listening and the less transmitting you will do.

## Picking Up New States

Upon hearing a station calling CQ, your first question to yourself will be, "Is it a new state?" If not, you will pass it by. Otherwise, a new one may show up and disappear while you are working a state already in your log. On this basis, you can ignore all "6's", as soon as you work California. The same will go for the "2's" when you have logged New York and New Jersey, and for the "9's" after you have logged Illinois, Indiana, and Wisconsin.

Stations from other call areas you will need to look up in the latest *Call Book*. States you have already worked you will ignore. The others you will call. Of course, many of the stations you hear will not be in the *Call Book*, because of the time lag between the issuing of a new license and the appearance of the call in the *Call Book*. On these you can gamble, if you wish. You may pick up a new state; otherwise, you can have a fine ragchew.

Should the station respond to another call, copy its location as the operator gives it to the other fellow. If it is a new state, you can leave your receiver set on the frequency and call again at the conclusion of the contact.

Do not become discouraged if you call the same station a half dozen times in a row without success. Remember, you do not get 100% returns, even when you are not "calling your shots." This is where a notebook in which to jot down the call letters, location, and frequency of each station you hear in states you have not worked, along with the time heard, comes in handy. Many amateurs observe a fairly regular operating schedule; therefore, if you hear him on the air at a certain time, that is generally a good time to listen for him the next day.

**John Buck, WN8RSC, demonstrates amateur radio to David Dixon and David Jackman at the Madison County Fair, London, Ohio. WN8SWT and WN8RQE also operated the fairgrounds station.**

## Getting Over The Hump

Depending upon your operating time, power, antenna, and a dozen other variables, following a plan such as outlined above will bring your states-worked total up to 20, 30, 40 or possibly 45, and there it will seem to stick. This is the time when intelligence and operating skill really begin to show up.

A successful, big-game hunter does not expect the game to come to him. Rather, he studies its habits and goes where it is most likely to run. Somewhat the same idea must be followed in hunting for the more elusive states.

An extreme example of looking in the wrong place at the wrong time for new states would be a Maine amateur who needed a couple of west-coast

*(Continued on page 40)*

# meet the Matchmaster

# 3 VALUABLE INSTRUMENTS IN 1

- **Dummy Load**
- **R-F Watt Meter**
- **SWR Bridge**

Here in one attractively finished unit, is a versatile, completely self-contained instrument with features enabling you to make fast and reliable measurements on **Coaxial Feed Lines, Antennas, and Transmitting Equipment.**

The Matchmaster is the answer to your matching problems and a precision guide. It eliminates all former hit and miss methods—assuring top performance from your equipment.

An integral R-F Bridge and Calibrated Panel Instrument provide a visual means of determining correct adjustment to Coaxial Type Feed Lines, Antenna Tuning Networks, Beams and Mobile Whip Antennas—**For Maximum Efficiency and Minimum SWR.**

The Calibrated R-F Wattmeter simplifies tuning of all r-f stages and enables proper adjustment of **circuit elements and voltages for Maximum Power Output** up to 125 watts and higher powers by sampling methods.

A built-in non-Reactive Dummy Load enables you to perform numerous **Tuning and Adjustment Tests—without Putting a Signal on the Air.**

Now you can make all of these highly important measurements and tests with this one instrument. The results will amaze you and you'll wonder how you ever got along without a Matchmaster.

### SPECIFICATIONS

Dummy Load—SWR-1.2:1 or better from DC to 30 MC.

R-F Wattmeter—Useable Frequency Range—From 500 KC to 30 MC.

Power Rating—100 Watts Continuous—125 Watts Intermittent.

Panel Instrument Scale—Calibrated to read R-F Watts and SWR.

Cabinet Finish—Blue Hammertone.

Model 650—52 ohms
Model 651—75 ohms

**Price $47.50**

**B&W BARKER & WILLIAMSON, Inc.**
**237 Fairfield Ave. Upper Darby, Pa.**

## Help Wanted

Daryl Dickson (14), 101 Plum Street, **Greenville, Pa.,** Phone: 799R.
Richard Cochran (19), P.O. Box 342, **Monument, Colo.**
John L. Hopkins, Jr. (17), 10 Vernon Ave., **Rockville Centre, Long Island, N. Y.** Phone: RO 4-7618. (Needs help with code and wants to know if there is a Novice Club near him.)
Steve Schaffer (14), 44302 Third St., East, **Lancaster, Calif.**
Edward J. Barczuk, 2648 No. Meade Ave., **Chicago 39, Illinois.** (Is physically handicapped and hopes to obtain his license by Christmas. He would like to contact physically-handicapped amateurs, especially those who are bed ridden, in the Chicago area.)
Richard Titus (14), Box 93, **Morrisville, Penna.**
Joseph Young, Apt. #5, CinClant, Naval Base, **Norfolk 11, Va.**
Norman Gould (14), 3032 Windsor Ave., **Los Angeles, Calif.**
Ronnie Conley (14), 432 45th St., **Ashland, Ky.**
Charlie Stouth, WN3ZRP (35), Box 378, **Secane, Pa.** Wants help in theory; so that he can pass General Class exam. Lives in Philadelphia area.)
Raymond Metiva, 112 So. Franklin St., (Zilwaukie) **Saginaw, Mich.**
Bob Jurish (17), 4230 W. Cullerton St., **Chicago 23, Illinois,** Phone: CR 7-6479.
Eric Johnson (15), 1403 West College St., **Lafayette, La.** Phone: 5-8024.
Jim Dalke (15), 702 Rainbow Ave., **Dallas, Ore.** Phone: 3405.

**Each month *CQ* lists the names of those requesting help in obtaining a Novice or higher grade amateur license. To have your name listed, please address your request to: Herb Brier, W9EGQ, 385 Johnson St., Gary 3, Indiana. Requests received by January 15, 1955 will appear in the March column.**

*(from page 38)*

states listening for them on 3.7 Mc. between 10:00 a.m. and 3:00 p.m. Any experienced amateur knows that a couple hundred miles is the maximum distance that can be covered on that frequency during daylight hours. On the other hand, this would be an excellent time to listen on 21 Mc. whenever that band is "open."

Less obvious is the fact that his chances would not be much better around midnight, even though he might hear a few west-coast stations trickling through. His chances of making the desired contacts then would be poor, because, although midnight is late enough on the east coast it is only 9:00 p.m. on the west coast. Therefore, Ham activity out there will still be near its peak value, and the resulting heavy interference will bury weak signals from across the continent without a trace. This is one of the reasons east-coast Novices must stay up until after 2:00 or 3:00 a.m. to have any real chance of working the west coast on 3.7 Mc.

On 7 Mc., conditions are often reversed. Eastern signals may be readable on the west coast early in the evening, but western signals may not be readable on the east coast. The explanation is that, in the winter months especially, 7-Mc. "skip" becomes quite long early in the evening; therefore interference from other amateurs within 1000 miles is not too bad. However, from mid-afternoon on, the short-wave broadcast stations that operate in the 7-Mc. Novice band are sometimes extremely strong on the east coast. They, therefore, fill up practically the entire band, even on a selective receiver, until they sign off late in the evening.

These examples are not cited to indicate that you should pass up calling any station you wish to work, no matter what time you hear it. They simply stress the importance of analyzing all factors when you are trying to squeeze the last mile out of your signal.

A handful of crystals is helpful in working new states. The closer you can put your signal to the frequency to which the other fellow's receiver is tuned, the better are your chances of attracting his attention. Also, a choice of frequencies often permits you to sneak into a hole in the interference. For this purpose, shifting frequency just a kilocycle or two is frequently more helpful than scooting half way across the band.

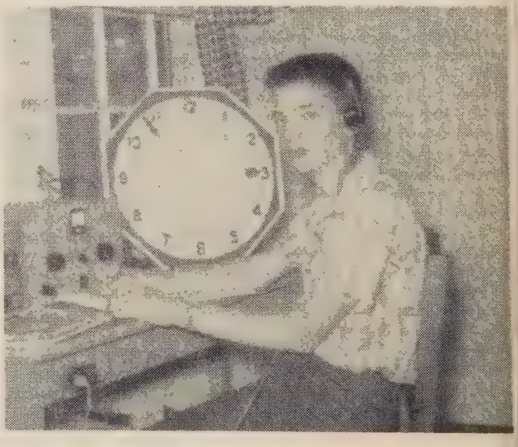
Certainly, very few Novices would care to concentrate on working new states exclusively. But the methods outlined for picking them up are typical of the kind of operating that will be required to work DX regularly when you get your General Class license. I say "when you get your General Class license," because the opportunities for working much real DX in the low-frequency Novice bands are few and far between. And while the 21-Mc. band does offer some opportunities along this line, they are not too abundant.

### News For And About Novices

Gerald Lindsay, W4EJP, 165 Spainhour Ave., Lenoir, N. C., writes; "Hi Herb. Just can't resist writing to you this time. My XYL, W4EJQ, had just finished a QSO, and it was my turn at the rig. At 2:33 a.m., I heard CQ sent until 2:42 a.m., without the sender signing his call. Then I heard 'de WN8---,' repeated for three minutes, followed by the call letters again, which were still being sent as the station faded away at 2:49 a.m.

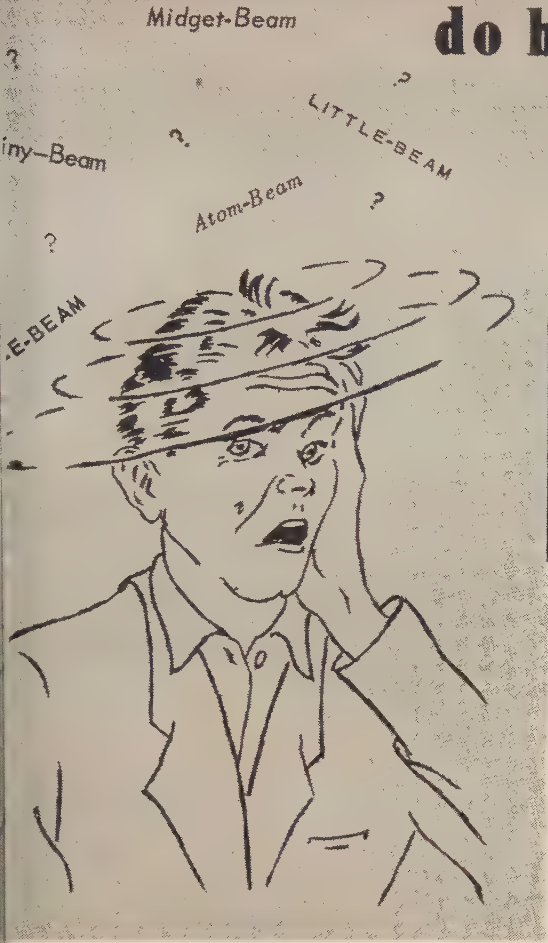
"Deane, the XYL, and I received our Novice tickets in March and our Generals in May, but we still do some operating in the 3.7-Mc. Novice band."

*(Continued on page 42)*



**WN1YNE, Graniteville, R.I. The operator, Gordon Fox, has worked 23 states and two Canadian provinces.**

# do beam ads have you CONFUSED?



**Then read what Hams say who own the**

## MOSLEY 'Vest Pocket' Beam

**led stations answer *Mac*, W9CVQ, Wilmette, Ill.**

I have found the Vest Pocket Beam highly sat-
ictory. Its power gain appears to be virtually
al to that of full sized beam antennas. I think
an summarize its performance by saying that
n I call stations on the V—P Beam, they come
k! Assembly of the beam was a straightforward,
ple task in view of the clear instructions and
or coding. I assure you I am well pleased with
MOSLEY Vest Pocket Beam Antenna."

**60 countries in 4 months, says *Leo*, W4ERK, Miam**

"...used a Vest Pocket Beam on 20 about fou
months. Cannot praise it too highly. We worked
all 48 states in 7 weeks. To date, over 60 foreig
countries. ...compliments daily on our signal."

**40 Meter QRM no Bogey for *Mel*, W0GQY, Denver**

"...the 40 Meter (Vest Pocket) Beam has prove
very satisfactory. *We have not lost a single contact from being covered up with QRM.* ...I think this beam is really worthwhile."

**Expanded Ham horizon for *Bill*, W0RFC, Waverly, Ia**

"I am very well satisfied with my Mosley V—P Beam. I hear countries I have not heard with any other antenna in my 20 years as a Ham."

**"Such good reports hard to believe", says *Frank*, VE6AC, Calgary, Alberta, Canada.**

"...I have found it hard to believe my ears. My power input ranges from 22 to 50 watts ...yet *my* reports are, almost without exception, much bette than those I am able to give. My Mosley V—P Beam (is) a joy beyond words."

**"Outstanding results" for *Whitey*, W4PQ, Miami.**

"...the performance and results obtained have been outstanding. W.A.C. and W.A.S. accomplished in a matter of days after the Vest Pocket Beam was installed, with many fine DX contacts."

**Zed-L's say S—9 on 40 meter sig now, reports *Nick*, W0MUY, Salina, Kansas.**

"Just a few lines to tell you how pleased I am with the (Mosley) 40 Meter Vest Pocket Beam. It is the best antenna, possible, for a city lot. It solved all my problems. I have been getting S—9 reports from New Zealand consistently. I have had several reports of 35 Db front-to-back. (I) do hope others will be able to enjoy the same advantages I have found."

**emember, when choosing Your beam—**

LEY 'V—P' Beams are made as small as
ible, consistent with *True Beam Per-*
*ance.* Element lengths are correctly pro-
oned to the loading coils to practically
inate end-fire. Boom lengths and element
ings are such as to provide outstanding
ard gain and front-to-back ratio with neg-
le SWR over a convenient bandwidth.
OSLEY 'V—P' Beams are built *up* to
standards ...not down to a low price for
*economy.* Quality materials and good
gn assure Long Service Life and *True*
*Performance.* MOSLEY Beams for 20
40 are available *NOW!* A V—P Beam for
d 15 will be announced soon!

**rder from your favorite Ham supplier!**

*Write for specifications and data sheets:*

## MOSLEY ELECTRONICS, Inc.

*(from page 40)*

Jim Wilk, **KN2IVZ**, 120 Brook Ave., Passaic, N. J., has a gripe: "Why don't the boys with the kilowatt rigs stay out of the Novice band? It is small enough without them.

"I have had my license since July, and I have had plenty of fun with my home-made 30-watter and 100-foot antenna. My receiver is an old *Philco* without bandspread, and I have to get on the air before 7:00 a.m., before I go to school. But I am saving my greenbacks for an *S-76* receiver. I would like to hear from other Novices, especially YL's around my age (17)."

Hugh Clark, **KN6HFA**, 545 West Vassar, Fresno, Calif., reports; "I run 20 to 25 watts to a *Heathkit* transmitter and receive on a beat-up *SX-25*. In five weeks I have had 100 contacts in 18 states, Hawaii, and Canada. Last night, a ZL (New Zealand) answered one of my CQ's, but I lost him. I work 7 Mc. only, and I get about 90-per cent return on QSL cards. I'd like to schedule anyone who wants to work California, especially a KN2 or WN3."

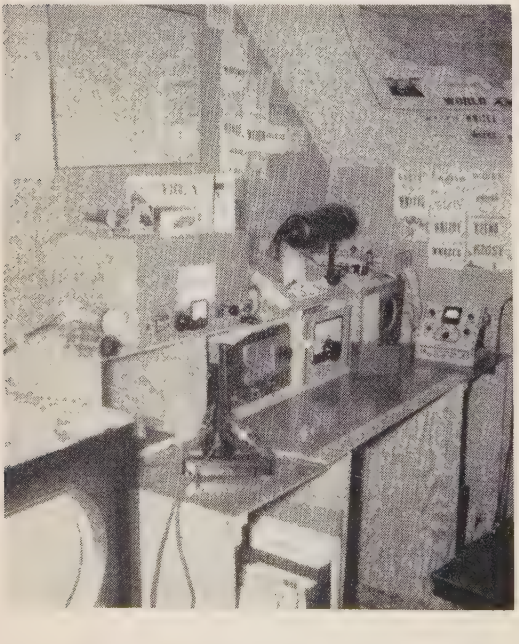
Bob Ziehm, **WN3ZNL**, 213 Market St., Poconoke City, Maryland; "Even before I got my license I used to enjoy reading the *Novice Shack* and hope I'd soon be logging stations right and left as many of the boys said they did in their letters. Well, I got my ticket and got on the air, but nothing happened. I did not log a single station for the first three weeks!

"It was pretty discouraging, to say the least. Finally, after finding a shorted tube in my transmitter and putting up a new antenna, I started getting results. I now have 13 contacts in four states, which is far from a record, I know, but it is better than none at all and a lot more encouraging, too.

"I hope this letter will encourage someone who is having difficulty getting started. I know the letters in the *Novice Shack* encouraged me. . . . My transmitter runs 25 watts into a 125-foot antenna, and my receiver is an *S-38B*."

Myrl Lamb, **WN0TVK** (15), 417 Jackson Street, Sterling, Colo., reports: "My transmitter is a Converted *BC-459A*, using a 12A6 crystal oscillator, as per *CQ*, February, 1954. It runs up to 75 watts when my antenna is tuned up. My receiver is a converted *Ward's* "Airline" console, and I also have a *Hallicrafter's 5R10A*, with a home-made b.f.o.

"In three months on the air, I have 20 states and Hawaii confirmed. I would like to make a Utah contact and to have some pen pals. (P.S. My brother is W0KAQ)."



**Jimmy Perkins, W5DRG, Brookhaven, Miss., used this equipment during his 3-month career as a Novice. He now sports an NC-98 and has worked 17 states.**

Mike Gauthier, **KN6ICS** (15), 5230 Ledgewood Road, South Gate, Calif., writes for himself and his brother, Barrie, KN6ICQ (11): "We have a *Heathkit AT-1*, a 'fish-pole' antenna, and an *NC-88* receiver, and I am on the air almost every day after 1600 PST. I listen on 15 meters every day, but I never hear anyone there. I'd like to work some DX, even a KN6 on that band.

"Barrie and I have an idea about starting a Novice QSL Bureau for all new Hams who do not have their calls listed in the Call Book yet. We would like to be the WN6/KN6 Bureau."

*(The boys have a noble thought, but I am afraid that the difficulties involved would make it impractical*—**Herb.**)

Stan Reed, **WN9IHK**, Box 493, Ashton, Illinois, gets right to the point; "I've been a Novice for three months, and I have worked 28 states and Canada on 3.7 and 7 Mc. But I've been wondering were those W1's were. I haven't found one yet.

"Rig is a *Globe Scout* feeding a Windom antenna, and an *S-38B* receiver."

Bob Mason, **WN3ZCN**, 1531 Denniston Ave., Pittsburgh 17, Pa. reports; "In your review of the *Heathkit AT-1* in the April, 1954, *Novice Shack*, you mention that 3.5-Mc. crystals are required for 7-Mc. work. I wonder if you overlooked the possibility of using 7-Mc. crystals on that band. I just plug in the 7-Mc. crystal, barely mesh the "Driver" tuning condenser and dip the final in the usual manner."

## More News

Ronnie Cook, **WN0VFC**, 706 Lincoln Ave., Clay Center, Kansas, says; "I am writing, because I never see a letter from Kansas in the *Novice Shack*. I use converted 'Command' transmitters running 50 watts input on 3.7 and 7 Mc. The antenna is off-center fed, and the receiver is an *S-40B*.

"I have worked 20 states. Best DX is California, Delaware, and New Jersey. For some reason, though, I cannot work a W7 and would like to make a schedule with one. . . . I give all the credit for getting my license to the hams around here, especially W0CFV and W0JDU."

Dale Cook writes, "I am sending this to tell you about the Altadena Radio Club. It is a fairly new club, and we will welcome suggestions and letters from Hams wanting skeds, etc., with our members. We would also like someone in the area for a sponsor.

"Some of the aims of our club are: To help prospective amateurs; Mutual help in members' problems; Advancement of amateur radio in general; and putting Altadena on the radio map. Three of our members already have their licenses (one a General), and mine should be in the mail now." Dale Cook for Robert Kornstien, KN6HBW; Mike Bartlett, KN6HWC; Jon Monsen, K6AAZ; Ronald Costell and Bill Welch, Altadena Radio Club, c/o 2109 N. Allen Ave., Altadena, Calif.

A/1c Jim Baker, USAF, **KN6GHL**, 763 Fifth Street, San Bernardino, Calif., reports; "While on temporary duty with the Air Force in Amarillo, Texas, I depended very much on amateur radio to keep in touch with my wife. I took my *Heathkit AT-1* and *Hallicrafter's S-53A* and operated as KN6GHL/5. Antenna facilities were practically nil and I made use of a double window screen of the barracks. I coupled it to the transmitter through a 15-foot length of 300-ohm ribbon. I was surprised to get so many 589 reports from California with the combination. I want to thank all the Hams who were so helpful to me in relaying messages to my wife.

"I am back in California and I am going to try 15 meters. I'd like to hear of the experiences of anyone who has used an *AT-1* on this band. Also I would gladly make skeds with anyone on 80, 40, or 15 meters."

Lewis Brooks, **KN2HKW** (16), 26 Walnut St., Salem, N. J., says; "I have had my Novice ticket since the latter part of March. I run 40 watts to a *WRL* exciter. My

*(Continued on page 55)*

# Worth waiting for!

## THE Harvey-WELLS T-90 SUPER BANDMASTER

This midget with the mighty punch is truly a fine piece of engineering. Our field and laboratory tests have indicated even better performance than might be expected from its power range. Here in one small package (only 12⅜" x 10½" x 6¾") is a complete 90 watt bandswitching transmitter for fixed or mobile operation incorporating more features per cubic inch than ever before offered at such a low price. In design, and in construction, the T-90 has "built-in" provisions for versatile adaptability in meeting most existing conditions of power source, antennas and other coordinated equipment. For example, filaments may be operated with either 6 or 12 volts input simply by proper wiring of the power input plug. A built-in low voltage D.C. relay is wired for antenna change-over; push-to-talk and receiver muting; and an efficient pi Network with a very flexible antenna loading circuit puts out the power and allows tuning out of considerable antenna reactance.

Other features include:

- TVI Suppression
- Complete break-in keying or keying of exciter stages only
- VFO tuning without carrier on
- Cathode biased exciter tubes, and clamper tube control of final screen voltage
- Selector switch for metering of PA grid, PA cathode and modulator currents
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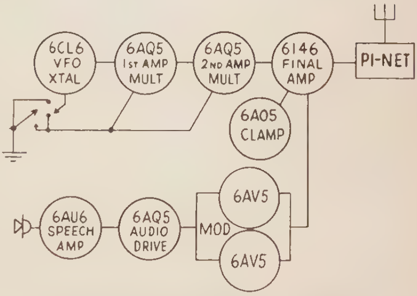
- Power supplies available for both fixed and mobile operation
- Price only **$179.50*** completely built and tested and with tubes

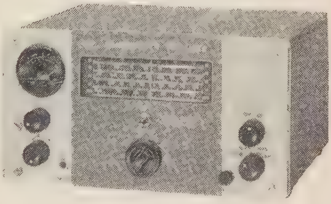
*For more complete information, request Bulletin HW 456 and HW 457*



### R-9 MATCHING RECEIVER

9 tubes — double conversion — packed with performance. Same size as T-90 transmitter — together they make a complete station in only one cubic foot.

Price **$149.50***



*Prices subject to change without notice.

**Harvey-WELLS ELECTRONICS, INC.,** SOUTHBRIDGE, MASS.

# the YL's Frequency

Monitored by

**Louisa B. Sando, W5RZJ**

Jicarillo Apache School, Dulce, New Mexico

"More licensed YLs than in any other family"—anyone want to challenge this claim? It's made by W7OSV; the Poulson family totals *five* YLs!

It all started when W7OSV became a Ham nearly five years ago. But we'll let him tell the story:

"I thought it quite unusual when XYL Reva came up with discussions of antennas and other things pertaining to radio. I soon discovered that she had long been studying the *Handbook* in order to participate in my new interest.

"Reva and our oldest daughter, Earlene, received Novice tickets three years ago. Their calls were WN7QWL and WN7QWM. Earlene allowed her license to lapse while she was at college. She is married now and hopes soon to re-establish herself as an amateur.

"Janet received her Novice ticket two and a half years ago and her General last year. At that time Reva converted to a Technician license, a bad case of jitters being responsible for missing on the code. The story does not end here. Our 12-year-old daughter (now 13), Marilyn, passed her Novice exam a year ago, to be followed by sister Carol, whose call is WN7UTA. In fairness I should emphasize that no credit comes to me for the achievement of the girls. It has been through their own efforts and the training carried on by their mother.

"During the past year Janet, W7RRM, has been president of the *Olympus Radio Club* (at Olympus High School in Salt Lake City where I am instructor in physics and sponsor of the club). She is also editor of *The Microvolt,* monthly bulletin of the Utah Amateur Radio Club.

"There are three rigs set up at the Poulson household and also a mobile. Janet operates a *Harvey-Wells TBS-50;* the receiver is an *S-77A.* The two younger girls have a home-brewed rig running 25 watts and an *NC-57* receiver. Another is soon coming up for Carol Ann to call her own. Our back yard is full of antennas. A 65-ft. tower supports 20, 10 and 2-meter beams.

"Janet can be found operating CW on 80, 40 or 20 in the afternoons or early morning. Carol Ann and Marilyn operate CW on 40 and 80 in the afternoon and at night. Reva operates on 220-Mc. and we QSO cross-band between home and school. Believe me, the most fun I have is working from the mobile talking home.

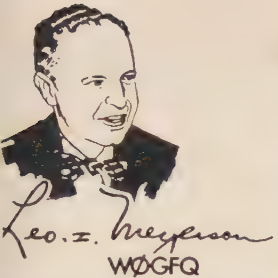
"In case it seems we have gone off the deep end in amateur radio, I should point out that the family carries on other hobbies together. They include weaving, photography, ceramics, boating, and others. We never let our hobbies interfere with what we should do, but we have loads of fun together.

"I am a proud OM."

Indeed you have reason to be, W7OSV!

(Continued on page 55)

**A proud OM—and why shouldn't he be? These are all his YLs and they're all Hams. L. to r. they are WN7UTA, Carol Ann, age 16; W7RRM, Janet, age 17; W7QWM, Reva (XYL); WN7UKF, Marilyn, age 13. The proud OM is W7OSV and his family also includes oldest daughter Earlene, x-WN7QWL, and three little jr. ops (two of them boys), whom he predicts will also some day be Hams.**



# CHECK THESE National NC VALUES . . . from WRL

THE WORLD'S LARGEST DISTRIBUTOR OF AMATEUR RADIO EQUIPMENT

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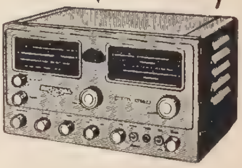

Top-notch value! Now, for the first time, a crystal filter, an S-meter, choice of electrical bandspread on amateur or SWL bands, an RF stage and 2 IF stages . . . only a few of its many fine features.

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**SPEAKER** for the NC-125 or NC-98 **$11.00**
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500 Watt — Completely Bandswitching

500 watts on fone & CW. Completely bandswitching 10-160M. Provisions for VFO and SSB input. Thoroughly screened and by-passed for TVI! Protective bias, dual power supply, push-to-talk, Pi-Network, just a few of the many fine features. Cash price: $675.00

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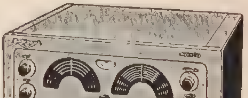

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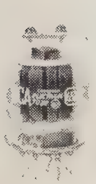
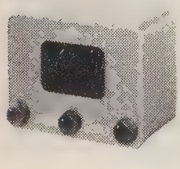
# what's NEW in HAM RADIO

*A comprehensive listing of late developments on the Ham Market, designed to keep the Radio Amateur well informed.*



Men! Throw out that war-weary 832 and in its place put the new **RCA 6524** u-h-f twin tetrode. The 6524 is a small, rugged beam power tube intended for r.f. use in fixed and mobile equipment operating up to 470 Mc. The maximum plate dissipation is 25 watts, and this neat little bottle can run 50 watts input on 144-Mc. fone all day without strain or pain. On the 420-Mc. band the 6524 will handle 30 watts input, plate modulated. The input and output capacities are slightly less than those of the 832, and the screen of the 6524 is of sufficiently high impedance so that the tube may easily be plate modulated to 100% positive peaks, a stunt that is not so easily done with some of the newer tetrodes. The ham interested in the "d-c bands" will find that the 6524 makes a nifty tripler from 7 Mc. to 21 Mc., and that each section of the 6524 can be used as a high efficiency doubler or tripler. Lastly, the tube is a "natural" for mobile work. Yessir, a line-up such as a 6CL6 crystal oscillator feeding a single 6524 would make a mighty nice 10-meter mobile job—and the sunspot cycle is on the way up!



The hams out at Gonset Co. in sunny (?) California have come up with a cute little gadget named the "Monitone." It's a combination code practice oscillator and phone/CW monitor. A built-in loudspeaker provides a good, husky signal for CW practice, with panel controls for tone pitch and volume. A separate monitor reproduces the keyed wave of the transmitter, and permits monitoring of AM phone transmissions. A self-contained supply is used, operating from 115-volt a.c. There is no possibility of shock hazard, since neither side of the keying circuit is "hot" to ground. All in all, a mighty handy gadget for oldtimer and novice alike. The "Monitone" is only about 7x5x4" in size, so it will fit right on the top of the operating desk. A note to the CQ "New Products" section will bring you further dope on this gadget and many more **Gonset** products.

UTC was building transformers for amateur and commercial use when a lot of Hams were walking around in three-cornered pants. It's obvious that the UTC line is top-notch, since they are now one of the outstanding bunch of coil winders and core stackers in W-land. The new 1954 **United Transformer Co.** Catalog A is now available, and may be had free for the asking. The old favorites like the "Special" line and the "CG" line are still in first place, and a new printed-circuit hi-fi amplifier kit is shown that will make the high-fidelity boys sit up and take notice! Using a pair of 5881 tubes, this amplifier deliver 20 watts with less than 1% intermodulation tortion. Then there are High-Q toroid coils for the lads, and 3000-volt, 1-ampere plate transformers (CG- for the California Kilowatts, and all sorts of goodies card will bring this new catalog post-haste.

Did you work VR2BZ/ZM the Tokelau Islands? No? you better read this, OM! TELREX boys of Asbury P N.J. won't give you a ZM7 card, but they will do the best thing. For a post card you can get all the informa on the new TELREX serie beam antennas for the 2,6,1 20 and 40-meter amateur ba The TELREX beams really a hole in the ether. The proof of this is to listen to some of the boys on the that use these antennas. Each TELREX beam featur T-match and balun assembly which results in a bala beam pattern, a low VSWR on the coaxial transmis line and minimum harmonic radiation from the feed But why go on? If you are on the ball, no more nee said. Drop us a line or take a good, long look at a REX array at your Ham outlet store. As a famou once said, "One TELREX in the air is worth kilo into Honorable dipole".

Here's a real good ince to throw away that 19 dering iron with the f cord and the red-hot tip vaporizes solder. The **W Electric Corp.**, Easton, has produced a junior sc ing gun **(Model 8100)** th easy on the poketbook price under 8 bucks) an incorporates many of th tures found in the larger models of guns. If you have stood around waiting for an old-fashioned soldering to warm up, you will appreciate this soldering gun t ready to go in a few seconds after the trigger is pr The 100-watt rating is ample for practically any ty work—you can even get enough heat from a gun o type at the end of an extension cord when you perched atop your antenna tower, working on th element 20-meter beam! The kids like to play Hop Cassidy with the gun, too! Available at all better parts stores. For additional information on this or Weller products, write: CQ, "New Products Column.

*(Continued on page 48)*

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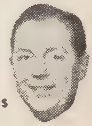

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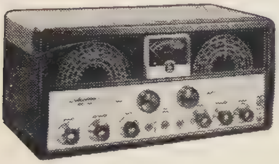

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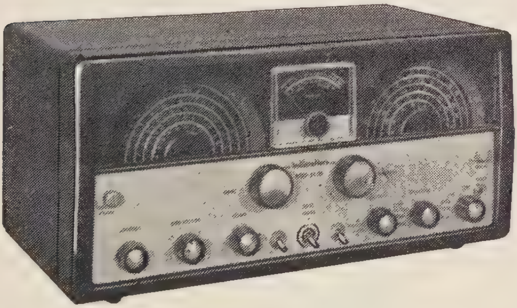

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| MODEL | CASH DOWN | 18 MONTHLY PAYMENTS | CASH PRICE |
|---|---|---|---|
| S38D | $ 5.00 | $ 2.70 | $ 49.50 |
| S94 | 6.00 | 3.20 | 59.95 |
| S95 | 6.00 | 3.20 | 59.95 |
| S85 | 12.00 | 6.50 | 119.95 |
| S93 | 10.00 | 5.40 | 99.95 |
| SX96 | 25.00 | 13.50 | 249.95 |
| SX71 | 25.00 | 13.50 | 249.95 |
| SX62A | 35.00 | 19.00 | 349.95 |
| SX88 | 59.50 | 32.40 | 595.00 |

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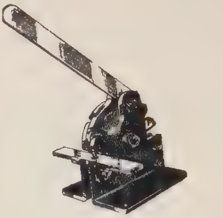
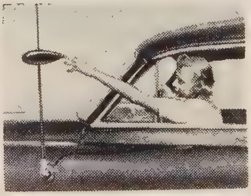
*(from page 46)*



If you have ever built a rig with a pair of automobile pliers and a dull Boy Scout knife, you will really appreciate this item. A "4-in-1" tool, that combines punching, forming, shearing and riveting operations into one handy device. Round, square, hex and rectangular holes can be punched in sheet metal; rivets may be fastened; smooth, sharp bends may be made in sheet metal; and sheet metal may be cut and sheared. No kidding, no home workshop can afford not to have one of these tools! Made of hardened steel, the **Tatu 4-in-1 Punch** is a cool device that you cats dig easy! Sold direct by Albert J. Tatu, Inc. It will be shipped postage paid at $9.95. For an extra skin (dollar bill to the squares) a threading attachment is available. Satisfaction guaranteed, or money back! Fair enough? Contact CQ for more info.

See that little gadget this well-manicured hand is holding? It's not a tube, but a miniature sealed relay! Available in various coil voltages and contact arrangements from the **Terado Co.**, 1068 Raymond Ave., St. Paul 14, Minn., this **Series 6000** relay with coin-silver contacts is just the ticket for mobile use, or for other types of construction where a small, rugged relay is needed. The relay coil only requires 60 milliwatts (!) for operation, and the contacts will handle one ampere of current on a 24-volt non-inductive load. Not bad for a relay ¾″ diameter and less than 2″ high. The Terado relay plugs into a 7-pin miniature tube socket and has 500-volt insulation.

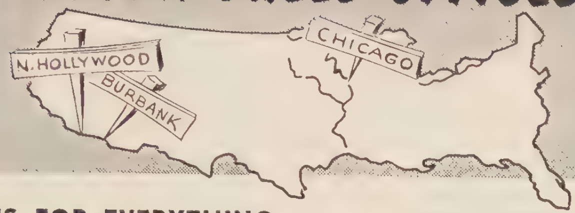


Ahoy, mobileers! Cast your eyes on this and this and this. The ATR-6B all-band mobile antenna! This red-hot idea of **Rex Bassett, Inc.** is ready to go with that all-band mobile rig. Tired of hopping out of the car to adjust that variable loading coil on your rear bumper? The ATR-6B is designed for cowl mounting on the *front* of the car, and may be adjusted from the driver's seat. Just flip the switch on the streamlined housing of the ATR-6B and the antenna automatically switches from band to band. Now why didn't I think of that idea? Rex did, and a quick card to us will produce the dope on this mighty interesting mobile antenna.

Isn't this a beauty? It's the new **Triplett Model 631** volt-ohm-meter and vacuum tube voltmeter combo. Incorporating 34 ranges (yes, 34!), the 631 will measure just about anything. For example: resistances from 0.1 ohm to 150 megohms, 0.02 volts to 1200 volts a.c. or d.c., at 20,000 ohms-per volt. When the VTVM is used, the input resistance is 11 megohms! Since the VTVM is operated from internal batteries, the **Model 631** is not subject to line voltage fluctuations. Really a beautiful job, isn't it? Manufactured by Triplett Electrical Instrument Co., Bluffton, Ohio.

*(Continued on page 50)*

# NOW! 3 ARROW SALES OFFICES!



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Made to operate in conjunction with Radio Receiver R9/APN-4. Unit includes one 5" scope tube, crystal controlled standard oscillator, sweep circuits, marked pulses. Good cond. Weight 45 lbs. WITH 27 TUBES & CRYSTAL **$19.95**

## ARC-4 MOBILE TRANSCEIVER

140-144 MC. Complete with control box, tubes. 12/24 VDC dynamotor with schematic. Good cond. With conversion data. Wt. 38 lbs. **$32.50**

Less dynamotor $24.95

## ARB NAVY RECEIVER

105 to 9050 KC. Four Bands, Calibrated Dial, LF-Ship-BC 6 Volt. Size 8¼" x 7¼" x 15¼". Excellent cond. With —80 & 40 Meter—Complete with Tubes and Dynamotor. For 24 Volt operation; easily converted to 110 VAC or 12 VDC with schematic. Weight 30 lbs. **$19.95**

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This is the BC-771 Freq. Meter, originally used in the RC-100 IFF system on 470/493.5 MC. Is completely self contained unit with own 110 v, 60 cy AC power supply. Beautiful steel cabinet, 10" deep. Panel size 9"x15½". Smooth action 5:1 vernier dial assembly. THIS IS A PERFECT SET-UP FOR THAT COMMUNICATIONS RECEIVER OR TEST INSTRUMENT YOU'VE BEEN PLANNING. Includes following tubes: 1—84, 3—7A4, 1—7C6, 2—955, 2—956; also octal base 4700 KC xtal. Dozens of useful capacitors, resistors, etc. With schematic and parts list.
WA $47.50. **NOW $24.50**
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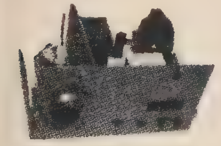

## R. F. MODULATOR

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## UHF TRANSMITTER-RECEIVER

### APS-13

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Freq. range 415-420 MC. 5 stages of 30 MC. IF amplifier Complete with R.F. and I.F. sections. Less dynamotor, tubes, and tube shields, with schematic. Excel. cond. Weight 14 lbs.

## ECHO BOX

Hand tuned ring box with associated dipole which picks up the RF energy from radar set. Freq. range: 3140-3640 MC. Ideal unit for experimental lab. Wt. 7 lbs. New condition **$4.95**

## BC-191 TRANSMITTER

100 W. With tubes, modulation section, speech amplifier for T-32 mike, RF meter, 0-500 MA meter, 0-15 DC filament meter. Plus schematic for converting this transmitter for AC operation. FREE: ONE TUNING UNIT with each transmitter! Excellent cond. **$24.95**
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## 3 TUBES — PRESELECTOR

Frequency range: 550 Kc to 32 MC in 6 bands. Includes internal rectifier for operation from 110V 60 cps. Mounted in steel cabinet. Used cond. Wt. Approx. 22 lbs. **$6.95**

## UHF TRANSMITTER

1 tube. Frequency range: 397 MC. For remote control of model boats, planes, etc. With tube, antenna. Less battery. Size of transmitter: 4¾ x 2¾ x 6". New **$2.95**

## TG-10 CODE KEYER

Self-Contained Automatic unit for code practice signals from an inked type recording. Complete with 7 tubes and electric eye: Audio freq. output of 800 CPS. Size: 11x24x18½"—110-220 VAC 60 cy.—78 RPM motor can be used for a turntable—Power unit can be used for a P.A. system— wt. 35 lbs. Used, clean cond. **$14.95**

## MOBILE POWER SUPPLY — HEAVY DUTY

PE 125 dynamotor, complete with filter base, starting relay and fuses. 12-24 V.D.C. input, ouput 400 V.D.C. @ 200 Ma. New **$12.95**
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— 2500 V.D.C. breakdown to ground. You can place next to a chassis or high-voltage leads without flashover or breakdown.

**Higher-than-ever lead strength**
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These are only two of the many reasons why Centralab Type MD Discs give you less trouble in the rigs you build. Get all the facts from Centralab Catalog No. 29. Send coupon for your free copy.

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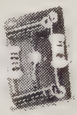
D-4454A

*(from page 48)*

**Bud Radio Co.** crashes through with their new "sliding drawer assembly" for relay racks. Designed to hold such things as record players or other instruments, the sliding drawer may also be used as an operating desk for a compact rack-built transmitter. Operating on ball-bearing channel slides, the rack drawer will support 50 pounds and is designated by **Bud** part number SD-1717. Write us for information on this drawer assembly.



TVI?? Is your fundamental signal blocking nearby TV sets? For a modest fee, you can install an HP-45 high pass filter on the affected TV set, and your troubles will be over. The **Regency** filter is a compact constant-K design, with a cut-off frequency of 45 Mc. Attenuation at 29 Mc. is 20 db., and at 14 Mc. is 40 db. Signals above 55 Mc. are passed by the filter without loss. Such a gadget as this will separate you and Jack Webb. Your neighbors will be glad to discover that Lucy and Desi are not really behind prison bars! Those are the facts, M'am. Write to CQ, "New Products," 67 West 44th Street, New York 36, N.Y. for full dope. That is all. Rosenquist.

## Always Say You Saw It In CQ!!

The above items are *not* advertisements, but new products selected by the CQ staff as being of interest to our readers. As an additional service, you may write to us for further information on any product which you feel may be of personal interest. To secure this additional information, type or print your name on a separate sheet of paper or postcard for each item. Send it to CQ Magazine, Attention "New Products," 67 West 44th Street, New York 36, N. Y.

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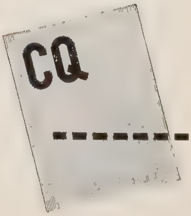

# BOOKS for HAMS

### Audio Amplifiers & Associated Equipment Vol. 5 (AA-5)

Published by *Howard W. Sams,* 2201 East 46th Street, Indianapolis, Ind. Indexed. 8½x11". $3.98.

The fifth volume in this series has just been released. It contains information on over 300 different hi-fi audio amplifiers and 85 tuners manufactured in 1953-54. Very handy item to have around if your friends become hi-fi conscious.

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## LEECE-NEVILLE 100 AMP. ALTERNATOR - - - $49.50

Originally Sells For $216.95

**FEATURES:**

1. 100 Amp. Charging Current
2. Charging current while motor idles
3. Eliminates generator hash & whine
4. AC output may be stepped up to operate 400 cycle surplus equipment

"SAVE OVER $100 ON THIS TREMENDOUS SURPLUS BUY."

Type 5024-G3 alternator delivers up to 100 amperes of charging current from 1500 Rpm to 12,000 Rpm. Alternator output is 7 Volts 3 phase AC (frequency is 1/10 Rpm). This is rectified by dry disc rectifier supplied to produce 100 amps. at 6 V. which will end your mobile battery problems and allow you to use that hi-power rig. Some amateurs are stepping up the AC output of the alternator by suitable transformers and operating direct the cheap 400 cycle surplus gear. Battery voltage & current regulation is taken care of through the regulator supplied. These units replace your original 6 volt generator equip. by use of suitable mounts which may be obtained from your local Leece-Neville distributor or we can supply at addn. cost. These new mounting kits contain all necessary hardware and wiring where original is not used. Price of these kits range from $20 to $50 according to car or truck make and model.

Above alternator, rectifier, and Type 3044-R3 regulator for 60 amp, output with circuit diagram, used but guaranteed.................. **$49.50**

5024-G3 Alternator, rectifier, and 3082-R-3 regulator for 100 amp. output with circuit diagram, used but guaranteed .................... **$59.50**

Include with order make and model of car or truck if mounting kit is desired (kit includes brackets, wiring harness, pulley and hardware). Kit cost $20 to $50 addn. and will be sent COD with order at prevalent factory price. Allow 10 days on kit orders as all types not in stock.

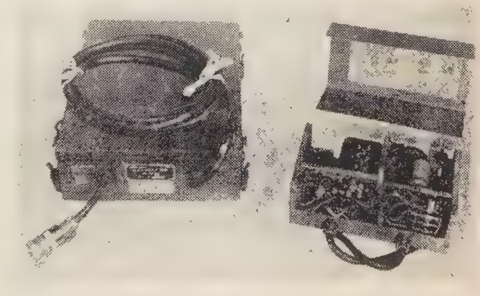
Ship wgt. alternator, rectifier and regulator 45 lbs.

## 6 OR 12 VOLT POWER SUPPLY - - - $3.95

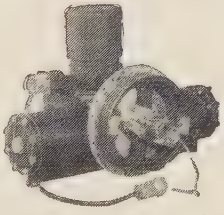
PE-117 vibrator power supply was designed for use on the Army BC-620 Transmitter and receiver a part of the SCR-509 and SCR-510. This will make an ideal supply for your mobile equipment on either the 6 or 12 volt cars. Voltage input changes are accomplished by merely changing links according to diagram in the cover (same vibrator used in either case). Supply is well filtered using choke input and plug-in type capacitors. Additional hash filtering is also incorporated for filaments of receiver. Output voltages are for transmitting 140 V. and 90 volts for receiving. The receiver output voltage is regulated by voltage regulator tube VT184. Maximum current drain is 100 Ma. Entire unit measures 12"x15"x4¾" in metal case or supply only may be removed for use which measures 11"x6"x4½". If you have no immediate use for this unit, it would be a good investment for possible future use. This is the type of surplus that doesn't last long at this price. Shipping wgt. approx. 32 lbs.

**Brand new units - - - $4.95**

**Used good units - - - $3.95**



## M-1 SERVO UNIT FOR BEAM ROTATION



Unit has self-contained hydraulic pump actuated by 27 V.—11 Amp. 1/5 hp. motor which pumps oil into either side of hydraulic piston giving better than a 100 lb. torque to cable drum. Unit is reversible by actuation of either of two self-contained solonoid hydraulic valves. Connect by cable around antenna beam for any desired rotation speed. Greater adaptability than any other surplus device on the market. Shg. wgt. 37 lbs.

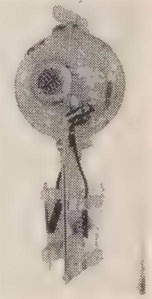
BRAND NEW—Only a few, order early **$4.95**

## STORAGE BATTERY 6 V. 34 AH

3-TA5-9B—Manufactured by Exide Battery Co. for aircraft. Size 5" x 5" x 9' overall. Shipping weight 15 lbs. New dry charge. Fill with 1.265 sp.g. sulphuric acid.

Price ................ea. **$5.75**

## AN/ART-4 TRANSMITTERS & TARGET



6' x 30' plastic screen target containing two transmitters complete with microphones. One transmitter on 55.5 Mc., other on 56.75 Mc. ¾ watt output using 3A5 tubes. Dry battery operated (batteries not included). Brand new, in wood box 10" x 12" x 75". Shipping Wgt. 75 lbs. Box or plastic screen alone worth price.

NEW..........ea. **$3.95**

REMIT SHIPPING CHARGE AND INSTRUCTIONS WITH ALL ORDERS. OTHERWISE ORDER WILL BE SHIPPED EXPRESS COLLECT. ALL ITEMS GUARANTEED TO YOUR SATISFACTION OR MONEY REFUNDED IF RETURNED PREPAID WITHIN 10 DAYS OF RECEIPT.

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Do you know?

We are the largest surplus crystals company selling NOVICE CRYSTALS in steps of 1 kc.

**ALL CRYSTALS TESTED FOR ACTIVITY!**
**1-DAY SERVICE FOR EVERYTHING IN STOCK!**

**NOVICE BAND**
**FT-243 FUNDAMENTAL FREQUENCIES**

Lots of 10 or more. Ea... **99c**
Individually. Ea. ............$1.25

**YOUR CHOICE OF FREQUENCIES!**

**80 METERS**
3701, 3702, 3703 through 3748 in steps of 1 KC.

**40 METERS**
7176, 7177, 7178 through 7198 in steps of 1 KC.

**DOUBLING TO 40 METERS:**
3588, 3589, 3590 through 3599 in steps of 1 KC.

*The new trend!*

**SINGLE SIDE BAND**
We have complete stock of FT-241-A for Lattice Filter.

*FT-241-A Low Frequency Crystals*

**79c**

Lot of 10 or more. Each ...... 79c
Lots of 5 or more. Each .... 89c
Individually. Each .............99c

| | | | | | |
|---|---|---|---|---|---|
| 400 | 446 | 453 | 459 | 466 | 474 |
| 440 | 447 | 454 | 461 | 468 | 475 |
| 441 | 448 | 455 | 462 | 469 | 476 |
| 442 | 450 | 456 | 463 | 470 | 477 |
| 444 | 451 | 457 | 464 | 472 | 479 |
| 445 | 452 | 458 | 465 | 473 | 480 |

**NOTE:** Minimum order: $2.50. All orders must be accompanied by check, cash or money order WITH PAYMENT IN FULL. No. C.O.D. Include approximately 5c per crystal for postage. Indicate second choice frequencies wherever substitutions may be made. Calif. buyers add tax.

**SEE OUR ADS!**
Dec/54 RADIO & TV NEWS. Page 137
December, 1954 C.Q.
For COMPLETE LIST of types of crystals, frequencies and prices.
Ask for FREE Crystal Catalogue!

**U. S. CRYSTALS, INC.** Dept. C
805 S. Union Ave. Los Angeles 17, Cal.

## Last Minute DX Items

From VQ4AQ, via CO2SW, we hear that **VQ9NZK** should be active from the Seychelles Islands towards the end of December (that means now)! Past performances of VQ4NZK/VQ1NZK seem to favor phone operation. . . . A letter from Ray Herbert, VS5KU (ex-G2KU/3A2AL), writing from **Seria, Brunei**, informs us that he will be active from this spot until January "at least". Ray has a miniature set-up with the transmitter and receiver each weighing two pounds and built on QSL-size chassis. He runs about 18 watts on CW only, and is also licensed as VS4KU in Sarawak, but does not think he will have the time to put this latter QTH on the air. . . . Dimiter, LZ1DP, runs **LZ1KAB's** new kilowatt rig every Saturday from 1400 to 1900 GMT on both phone and CW. LZ1KAB may also be heard, some Sundays, from 0000 to 0600 GMT. Present antenna is temporary and consists of a random length of wire. Nevertheless many W's and DX have been contacted on 14, 7 and 3.5 Mc. . . . OE1FF passes the word that **HB1MX/HE** is still QRV from Liechtenstein each week-end on 21, 14 and 7. Operation on 3.5 Mc. is promised for this Winter. . . . **T19UXX** slipped one over on us as he was apparently active from Cocos on October 27th as confirmed by several W6 QSO's. . . . All **KC4AB** cards have now gone forward with the exception of a few DX contacts which will be taken care of before Xmas. Some $200 in contributions are gratefully acknowledged by KC4AB towards defrayment of partial expense of the trip. . . . VK3CX reports contact with **ES1D** who was apparently operating on the ship "Pfal" at Wrangel Island. . . . Reports have it that **FB8BK**, Tromelin Island, went QRT on November 25th. . . . VK4YP says **ZC3AC**, Christmas Island, has been worked on 14050 CW and says QSL via VS2DQ. . . . The latest overheard from Thailand says that **HS1C** is now active with a QRP rig. He is a W6. **HS1D** visited the VS6 gang. **HS1AA** is active on phone only with a Collins 32V-2/75A-2 set-up. . . . November 18th gave KV4AA a rather rare Isle of Pines contact when **CO2CT/4** was nailed. He said "I am on the ground, in an airplane, and am taking off in five minutes for Havana". . . . **VR3A**, Fanning Island, should have been heard on the air again after December 15th after a spell of QRT. . . . **FG7XB** has been active, 14077, and runs a ten-watter. His QTH, thanks to W5GSR is: Antoine Noel, 44 Chemin des Petites, Pointe a Pitre, Guadeloupe, FWI. . . . **AP2K** will QRT on December 25th and move to Egypt. . . . Contacts have been reported between **UB5KAB** and Messrs. W8PQQ/W4GG and W4QCW. Also between W6NZW and **UB5KBE.**

## *New FCC Waiting Period*

On December 1, 1955 the Federal Communications Commission modified Rule 12.49 applying to the waiting period for license re-examination. In the past it has been necessary to wait 30 days for re-examination upon failing a license test.

The new ruling permits an applicant to appear at an FCC office and to take the "General" examination regardless of whether or not he has recently failed the "Novice," "Technician" or "Conditional" exam. Thus the 30-day waiting period is now waivered.

## Predictions

*(from page 37)*

present time the smoothed sunspot number predicted for January, 1955 (and upon which the *Propagation Charts* are based) is 10. From the average of past cycles it appears that the count should increase by about 2 a month and should be up to about 35 by December of 1955. This range of sunspot numbers is higher than that observed during 1954 or 1953, but is not as high as the sunspot years.

*(Continued on page 55)*

# ELECTRICAL ENGINEERS
# *or* PHYSICS GRADUATES

*with experience in*

## RADAR *or* ELECTRONICS

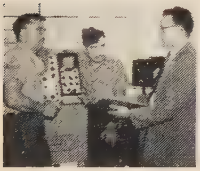
*or those desiring to enter these areas...*

*The time was never more opportune than now for becoming associated with the field of advanced electronics. Because of military emphasis this is the most rapidly growing and promising sphere of endeavor for the young electrical engineer or physicist.*

Since 1948 Hughes Research and Development Laboratories have been engaged in an expanding program for design, development and manufacture of highly complex radar fire control systems for fighter and interceptor aircraft. This requires Hughes technical advisors in the field to serve companies and military agencies employing the equipment.

As one of these field engineers *you will become familiar with the entire systems* involved, including the most advanced electronic computers. With this advantage you will be ideally situated to broaden your experience and learning more quickly for future application to advanced electronics activity in either the military or the commercial field.

Positions are available in the continental United States for married and single men under 35 years of age. Overseas assignments are open to single men only.



Hughes Field Engineer H. Heaton Barker (right) discusses operation of fire control system with Royal Canadian Air Force technicians. Avro Canada CF-100 shown at right.

Relocation of applicant must not cause disruption of an urgent military project.

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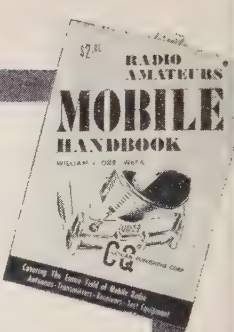
## $1.50

## Single Sideband Techniques

### by Jack N. Brown, W3SHY

*Wish we could say that we suddenly thought we'd better put something out on this subject—but, sorry—we just can't. Carefully written, prepared and edited, this book required six months to assemble. Regardless of whether you know quite a lot about SSB, or absolutely nothing—this is the text that covers it all—from start to finish. Half of the book is devoted to pieces of SSB equipment that you can build.*



## $2.00

## Radio Amateurs' MOBILE HANDBOOK

### by William I. Orr, W6SAI

*The only practical handbook on the market today on the subjct of Ham mobile installation, operation and maintenance. Not just talk and theory, but complete text and schematics on converters, receivers, power supplies, antennas and transmitters. Thousands have already been sold and are in the hands of the mobile operators that really "get out." Just about at the point where we can say, "only a few copies left." Get yours today.*

## CQ Yearly Binders

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*Wondering what to do with your loose copies of CQ? That's easy. Get a CQ binder at a ridiculously cheap price and have them at your fingerstips. Why dig around under the desk, or in some old box to find an important CQ schematic? Put your CQ issues immediately in a steel reinforced red fabricord binder and keep them orderly and handy. When ordering be sure to specify whether you want yours stamped for a particular year, or just plain.*

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CQ-1

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I enclose $________ for which please send me:

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All New York City purchasers please add 3% sales tax to above items.

My correct address is: (Please Print)

____________________ (name) (call)

____________________ (street or avenue)

____________________ (city (zone) (state)

(from page 52)

umbers that were recorded during 1952. We can there-re certainly expect improved conditions during 1955—ot greatly improved over 1954 and 1953, but very similar conditions observed during 1952.

## 1955 Predictions

**en Meters:** Sunspot numbers still not high enough for consistent DX. Short skip will occur during the spring and summer months with a noticable increase (but still few and far between) in DX beginning with October 1955.

**ifteen Meters:** Fair DX will continue on this band until February 1955. During the summer months there will be plenty of short skip and some DX on north-south paths. This band should improve considerably for DX beginning in late September of 1955, with world-wide DX possible almost daily until March of 1956.

**venty Meters:** About the same as in 1954. World-wide DX possible during the daylight hours of all seasons. Somewhat of an increase in early evening DX may be noticed during the summer months of 1955.

**rty and Eighty Meters:** Ionospheric conditions on these bands will be about the same during 1955 as they have been for the past two years, with an improvement expected on dark hour DX on 40-meters during the fall of 1955.

The main point is that the cycle is on the upswing again d conditions will steadily improve over the next few ars.

---

## Novice Shack

(from page 42)

ceiver is an *S-38C*, soon to be an *NC-98*. I operate on 7 c. and have worked 29 states, 26 confirmed, VE2 and E3, and a couple of Puerto Rican stations.

"I would like a sked with anyone in W7 land, also th Colo., Minn., Nebr., and the Dakotas. So how about u guys out there writing for skeds. Maybe we can both rk a new state."

I get a fairly regular number of questions on how one gets his picture into the *Novice Shack*. Just send them in, and I will use as many as I can. *Happy New Year, Herb, W9EGQ.*

---

## YL's Frequency

(from page 44)

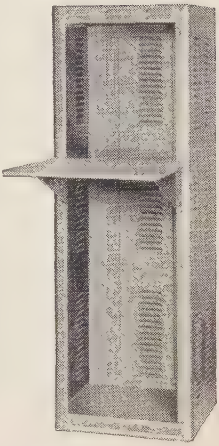
### YL Radio Club of San Francisco

Back in the June issue we introduced the new YLRC of n **Francisco.** Their first organizational meeting was d a year ago January with two girls holding General enses, two with Novice, and eleven hopefuls. Now (Nonber) the club roster boasts four Generals and seven vices, plus another seven studying. Non-licensed gals encouraged to join as conditional members, and as n as they receive tickets become full members.

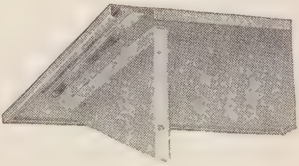
(Continued on page 56)

New BUD SHELF ASSEMBLY

The new BUD Shelf Assembly SA-1720 is easily and quickly installed on any standard rack. Can't fall off, can't tilt . . . perfectly safe for any object placed on it. Useful as a desk . . . as work space and for many other practical purposes. Finished in your choice of black or grey wrinkle or grey hammertone at no extra cost. Here's an attractive and useful addition to your rig, see it at your distributors today!



Besides being low in cost, an outstanding feature is that no panel is needed for support. Two supporting brackets slide into tracks welded to the shelf. These brackets are punched to fit standard panel mounting strips. However, the shelf may be attached over a rack panel if so desired.



The shelf is 20" deep and 22" wide, formed from 16 gage steel, flanged on four sides for greater strength and rigidity. The supporting brackets are made from 1/8" steel, capable of supporting any reasonable load. Over-all height of assembly is 7". Furnished complete with necessary mounting screws.

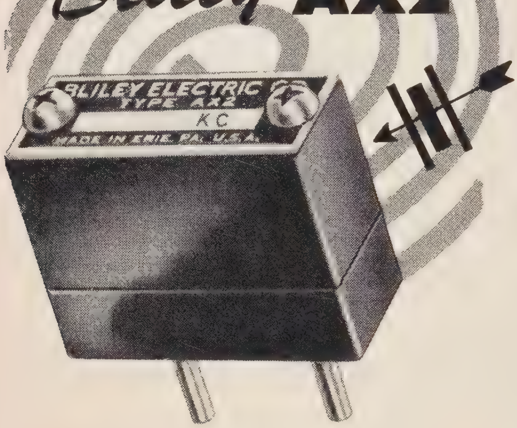
**SA 1720 Amateur Net — $10.05**

BUD — THE MARK OF PERFECTION

**BUD RADIO INC.**

2118 East 55th St. Dept. Q Cleveland 3, O.

NOW.. FOR SPOT FREQUENCIES . . . THE Bliley AX2



| RANGE | PRICE |
|---|---|
| 1800 kc—2000 kc | $3.75 |
| 3500 kc—4000 kc | $2.95 |
| 7000 kc—7425 kc | $2.95 |
| 8000 kc—9000 kc | $2.95 |

Now . . . for spot frequencies . . . the Bliley AX2 is supplied at any integral frequency desired in ranges indicated. Calibration ±500 cycles; drift less than .0002% per °C.

Famous Bliley quality—which means finest Brazilian quartz, precision oriented, and acid-etched to frequency. All electrodes, springs and contact pins of the holder are stainless steel.

*The AX2 and other Bliley amateur products may be obtained at your nearest amateur distributor. Ask him for Bliley Bulletin No. 44-B.*

Bliley CRYSTALS

BLILEY ELECTRIC CO.
UNION STATION BUILDING
ERIE, PENNSYLVANIA

*(from page 55)*

The **YLRC/SF** holds regular training classes for mer bers only. Every Tuesday and Friday evening **W6QM** Jeri, conducts code classes and on Fridays her O **W6PHS**, holds theory classes. They use a **TG-10** donat by **W6GGC** and code practice tapes the club purchased.

The club asked for and received generous gifts fro local Hams of crystals for the Novice frequencies ar they now have a "crystal pool" from which the Novi members can draw. **W6PHS** donated ten crystals for 37 kc. so the club holds a Novice roundtable each Thursda at 1300. At their monthly meetings the club gives a pri to its Novice member who has made the greatest numb of contacts during the past month.

Instigator of the club was **W6QMO**, Jeri Bey, but Je adds, "W6PCN, Peggy, has been with me from the sta and with me all the way." Jeri has been serving as cl president and Peggy as secretary-treasurer-P/C.

Besides all Jeri's club work (she has recently been elec ed secretary of the **San Francisco Radio Club**, has bee chief of the club's cook tent for Field Day the past tw years), **W6QMO** is a regular in the BPL listings. Sh says her highest score was 723 in August and low score 59 in May. She handles it all on 75 phone and with no he from the OM. Most of it comes via *MACAN 4*, the re on the *Mission Trail Net* and *American Legion Net.* Sh is a *MARS* station and also joins the *29ers* on 29 M Thursdays at 2000. She holds an OPS appointment, an has RCC. Don't ask Jeri when she does her housework— hi!

Jeri and her OM, **W6PHS**, hail from New Jersey; hav been in San Francisco for seven years. Jeri received he Novice license in '52, her General a year later. Most of he time was spent on 40 CW until she got started handlin traffic on 75, and she still finds time to get on 40 and 8 CW. At present they are using a *Viking II* with VFO Receivers are *RBY1* and *RBY1* panadapter, plus an *SX-2* and *SX-25*. In the process of being rebuilt is a 500-wat all-band rig. Antennas are a 10-meter beam, 20-mete ground plane and 40- and 80-meter dipoles. They als have a 10-kw. emergency generator and a one-cylinde gas engine power supply for low-power portable use.

**Some of the members of the YL Radio Club of San Francisco. L. to r.: W6QMO, Jeri; KN6GDC, Elvi; KN6EEE, Vi; W6PCN, Peggy; KN6CUV, Lee; KN6EEV, Eleanore; Rose, XYL of W6GGC.**

**W6PCN**, Peggy Detsch, has been the second guidin light of the **YLRC/SF**. Unlike some XYLs, she knew wha she was getting into when she married a Ham, **W6GCV** "In fact," says Peggy, "I started the rocky road to radi before we were married. It's been a tradition in our family that the bride automatically absorbs her husband' hobbies and I counted myself lucky that I didn't pick guy who wanted to climb mountains or go count birds i the cold grey winter dawn like some of my less fortunat (from my point of view) relatives. The final amplifier o the 'big rig' chaperoned us on all our early dates becaus Jack couldn't bear to take it out of the back seat of th car and our first housing had to be chosen with a view t including the ancestor of the present power supply. I go my 'on the air' code practice under Jack's call and I didn' get much of that because he was always taking the ri apart to revise it until I made a bargain that if I'd ge my license he would leave the rig alone and build another to revise. I got my license in 1951, and that's our 'working agreement' now. Jack has added a modulator and now has a teletype printer to be put into the set-up somehow. We added two junior ops along the line so most of my operating is on a more or less appointment basis. When Jack gets generous, he tells the KA's and KL's, I'll be glad to run their phone patches during the daytime!"

**W6PCN** spends all of her time on 20 phone. Their rig runs a kilowatt to a 3-element beam on the roof. The receiver is an *SX-88* but the rest of the station is homebrewed. Peggy is registered in AF MARS (she's awaiting completion of a TCS), and edits the San Francisco Radio Club paper.

Among the other members, **KN6GDC**, Elvi, is an MYL (mother YL). She put together her own *Heathkit* transmitter and is working hard for her General. Her son is at the Atomic Powered Sub school and she is anxious to QSO him. . . . **KN6EEE**, Vi, also is an MYL. Her son, **W6FVK**, is now in the Navy. Vi's OM is **W6JLV**.

**KN6CUT**, Myrtle, gave in to Ham radio after 19 years' xposure—first with her brother and then her OM, **V6AHH**. They have a 16-yr. old son who goes mobiling vith his Dad, and 10-yr. old Carol, who is a "mascot" of he YLRC/SF and is studying code. . . . **KN6CUV**, Lee, is he XYL of **K6BZY** and they have a 9-yr. old son.

**KN6HIW**, Kay, and her OM entered Ham radio toether. Kay has an 8-yr. old daughter and she works as accountant so her time is well occupied. . . . **W6GQZ**, a, is a working gal but joins the club members at nventions. . . . **W6PIR**, Mary, married last April, is arching for a virus to infect her OM with Ham radio g. . . . **KN6EEV**, Eleanore, had a son born July 2. . . . oungest club member is 10-yr. old Patty Fryman, **N6GXQ**, daughter of **W6NCK**. Her sister, Susan, aged 8, working for her license, too.

This month (Jan.) the YLRC/SF will celebrate its first niversary with a dinner and dance and installation of w officers. Describing the aims of the club Jeri, **6QMO**, says, "Our purpose is to get more women inested in Ham radio and to get them licensed, or failing at, at least to get them to look with a more tolerant eye their OMs' hobby."

Well done, gals!

### 1st International YLRL Convention

**Date: Weekend of June 25, 1955**
**Place: Hotel Miramar, Santa Monica, Calif.**
**Sponsors: Los Angeles YL Radio Club**
**Chairman: W6UHA, Maxine Willis**

**KH6AFN, Jeannette, has been selling Christmas cards to earn money for the trip to the convention. W3OQF, Barbie, says "We'll be there." Let's hear from more of you YLs!**

## YL-OM Contest

The annual *YL-OM Contest*, sponsored by the *Young dies' Radio League*, is scheduled this year for the first d third weekends in March. The phone section will be rch 5-6 and the CW portion will be March 19-20.

This will be the 6th annual *YL-OM Contest*. It is open *all* YLs and OMs and offers a fine opportunity to build YL contacts for WAS/YL and YLCC awards. Put the es on your calendar now. Rules for the contest will given here next month.

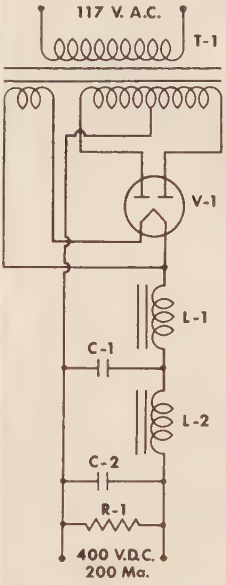
## Emergency Traffic

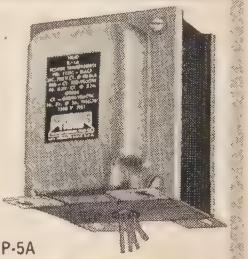
When Hurricane Hazel struck North Carolina, **W4SGD**, herine, found herself right in the thick of it. Winds to 100 m.p.h. knocked down 35 big trees on their prop-, but otherwise they escaped damage. Katherine says *Tar Heel Emergency Net* was in session from Thurs-

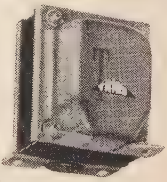
*(Continued on page 58)*

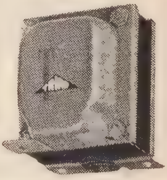
GENERAL PURPOSE POWER SUPPLY

This power supply is ideally suited for transmitters operated under **Novice** class licenses. When higher R.F. power is added later on, this supply may be used as a **modulator** power supply.




P-5A


C-31A


C-14A

| Symbol | Triad Type No. | List Price | Characteristics |
|---|---|---|---|
| T-1 | P-5A | 16.75 | 1100V CT Output: 400V DC @250Ma 5V @ 4A Fil. |
| L-1 | C-31A | 8.20 | 25/5 H @ 20/200Ma DC 150 ohms 1500V Test |
| L-2 | C-14A | 5.85 | 6H @ 200Ma DC 150 ohms 1500V Test |

**Additional components required as follows:**

C-1 2 mfd 600V Oil filled — C-2 4 mfd 600V Oil filled
If the above values are used, Ripple will not exceed 1.5%
R-1 20,000 ohms, 25 watt wire wound — V-1 5R4GY or 5U4G

See your distributor or write us direct for your copy of Catalog TR-54E
It completely describes the finest line of transformers made.

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WEST COAST ELECTRONIC MANUFACTURERS ASSOCIATION MEMBER
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UNVEILING EARLY IN 1955

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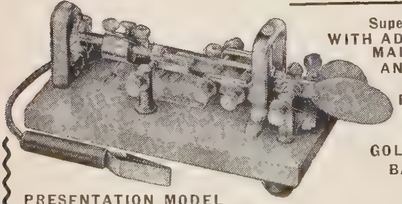
DEPT. A DEEP RIVER, CONN.

AMAZING NEW VIBROPLEX



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THE VIBROPLEX CO., INC. 833 Broadway, N. Y. 3, N. Y.

*(from page 57)*

day night before the storm until the following Wednesday. She manned her station for about 50 hours, most of the time listening and being ready to relay traffic.

In the same storm the *Pennsylvania Emergency Phone Net* was in operation on Oct. 15-16 using 3850 kc., which was declared an emergency frequency by FCC. **W3QPQ**, Jeannette, acted as NCS for a portion of the time and was on the air for the full time of the emergency. **W3SVY**, Loreli, assisted by landline contact to **W3QPQ**, and handled some traffic on CW. Loreli and her OM lost their 46-ft. tower with all antennas in the storm, but strung up a long wire to keep operating.

When flood waters hit the Pecos River Valley in southeastern New Mexico in October **W5YAS**, Blanche, **W5BZB**, Pat, and **W5TDB**, Emma, assisted in handling traffic.

## Dakota Division Convention

A dozen YLs met at the *Dakota Division Convention* at Rapid City, S. Dak. in Sept. The XYL Club, which aids and shares in the recreational activities of the *Black Hills Amateur Radio Club*, conducted a tour for the ladies and a Saturday luncheon. All but one prize given at the luncheon were made by members of the XYL Club and included earring and pin sets, ceramic dishes and candle holders, and hand-painted wooden plate. Among the YLs were **W0's ZWL**, Hazel (president of the XYL Club); **CJY**, Pearl; **DVB**, Dorotha; **UAJ**, Pat; **UDU**, Marj; **VVA**, Bea; **BHP**, Hazel, and her two daughters **WN0VHB**, Carol (age 14) and **WN0VHC**, Joyce (age 11).

## YLRL Net

Another YLRL net to add to those published earlier: 80 CW—3680 kc., 2100 PST, Mondays, NC **W7GLK**.

## Congratulations

To **W7FWR**, Mary Ann, and OM **W7FWD** who celebrated their Golden Wedding Anniversary Sept. 14.

To Roxanna Griggs on becoming **KN6ELO**. Roxy is the XYL of **W6KW**, Southwestern Division Director for many years.

33 till next month—*W5RZJ*

## SSB Exciter

*(from page 31)*

the parallel connected *R/C* time constant circuit composed of *R11* and *C3*. This voltage should be in the region of 50 to 70 volts for normally spoken speech for average settings of the gain controls. This negative voltage is used to cut off the relay tube, *V5b* so that the relay *Ry1* applies the various screen and plate voltages when the relay goes to the de-energized position.

The receiver anti-trip amplifier takes a portion of the receiver audio and amplifies it, rectifies it with a positive polarity and applies it to its own load resistor and time-constant condenser. The resultant of the anti-trip and voice control voltages is applied to the grid of the relay control tube, *V5b*.

*(Continued on page 60)*

CQ

—•—•
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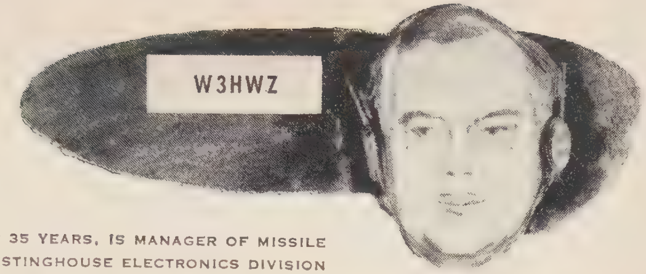

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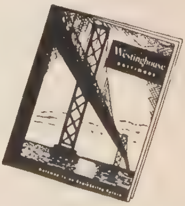

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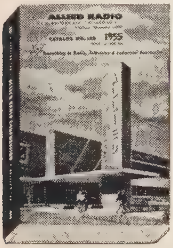

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*(from page 58)*

If the voice control system holds in too long between words or phrases, the time constant combination of *R11* and *C3* should be decreased by decreasing the size of *C3* to 0.05 µfd. Experimentation will yield the correct time constant to use.

**End of Part I**

**In the second part of this article the author goes on to discuss the construction of the exciter and its operation. Detailed photographs and drawings are included.**

## "Complete 25-er"

*(from page 21)*

### Tuning The Transmitter

After the wiring has been completed and checked, turn *Sw3* to "Off," *Sw5* to "Receive," and *Sw2* to "Tune." Insert the 5U4G rectifier tube and the OA2 voltage regulator. Plug the power cord into a 117-volt, a-c receptacle and turn on *Sw3*. The pilot bulb and the 5U4G should both light, and the d-c output voltage from the power supply will be around 400 volts. Turn *Sw5* to "Transmit," which should actuate the control relay and cause the OA2 to glow. The voltage across the tube will be about 153 volts.

Return *Sw5* to "Receive," and plug in the two 6C4's. While they are warming up, turn *Sw1* to "VFO" and warm up your station receiver. Again turn *Sw5* to "Transmit" and tune the receiver around 3500 kilocycles until you locate the signal from the transmitter v.f.o. Adjust the slug in *L1* and, if necessary, the number of turns in the coil slightly; so that the oscillator covers 3500 to 3700 kc., as condenser *C1* is varied from maximum to minimum capacity.

Set the oscillator dial to about 3600 kc, and remove plate voltage with *Sw5*. Plug in the 6AK6 and the 7-Mc. coil into the *L4* socket and make some provision to measure the grid excitation to the 6AK6 while you peak *L3*. This may be done by temporarily connecting a low-range milliammeter between the bottom of *R3* and ground or by plugging a 50-ma. meter into the key jack. In either event, turn *Sw2* to "Operate" and *Sw5* to "Transmit" while you adjust the slug in *L3* for maximum meter deflection. Do not leave plate voltage on any longer than absolutely necessary in making this adjustment; otherwise, there is a possibility of damaging the 6AK6, because its plate tank circuit has not yet been resonated.

After *L3* is adjusted, plug in the 2E26, but first temporarily break the B+ lead to it at the point

*(Continued on page 62)*

# An Open Letter to Hams About Antennae

**(Refer to page 121 — Oct. '54 issue — *QST*)**

WE HAVE been told in many ways that our rig is no better than the skyhook we tie it to. We try for maximum ransfer of energy for transmitting as well as for receiving the other o.m.! These are true facts and especially ital to us, but we string up the best wires we can regardless of their effect upon one another because we want o work more than one band—especially when one goes out! What then is our problem? To design and build a *INGLE* antenna which shall be erected in the smallest possible space over the best ground we can produce; hich will give us maximum transfer of energy for both transmitting and receiving; using one feed line; and nable us to work not one, but four or more bands without loading coils or capacitors at the antenna; without pecial relays; or *WITHOUT HAVING TO MAKE ANTENNA ADJUSTMENTS!* This would be the ideal sky-ook, especially in most cases, if the radiation could be the same in all directions. It sounds *IMPOSSIBLE.* But is being done *now* through a principle known as *ELECTROMAGNETIC DECOUPLING* and these antennae re available to you in six different models at a far lower cost than you could produce your own even if you had complete workshop and the many different materials required!

ONE of the antennae, for example, is the A.E.C.'s V-37 which comes in two models—Deluxe and Economy. ith this antenna, several ground radials and 50-ohm coax you are *AUTOMATICALLY* on 75/80, 40, 20, 15, 11 nd 10 meters *as fast as you can change your transmitter*—and with absolutely no adjustments of any kind at he antenna!

THE price for the Deluxe V-37 is $299 while that of the Economy V-37, where *you* supply guy-wires, radials nd other immediately-available material (which you may already have) is $199! The rest of our story is told n Page 121 of the October issue of *QST*. Write us. You'll be glad you did!

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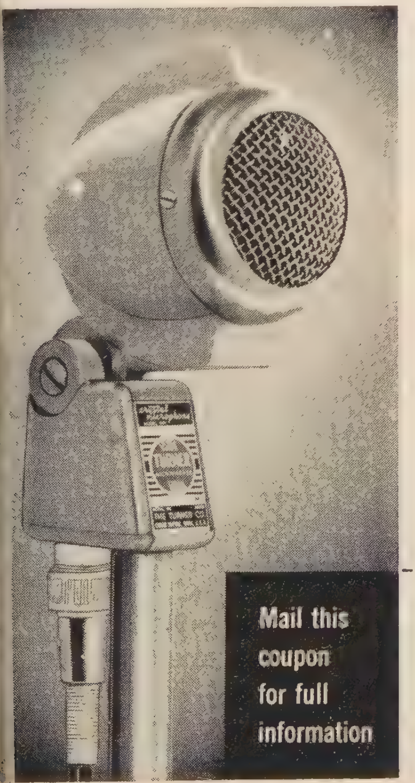

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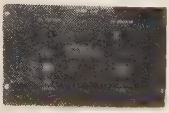

Attractive matching unit for the "MARK 35" Transmitter, 360 VDC at 120 ma. Provides 35 watts input to the final.
"MARK 35P" Power Supply ....... **$29.50 NET**

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*(from page 60)*

indicated in the diagram. Connect the low-rang milliammeter between *R6* and ground, and adju *C28* mounted on *L4* for maximum meter deflectio Use a non-metallic tool for this adjustment. Th *L4* coils for the other bands may be peaked i the same manner at this time. 2E26 grid curre will decrease from five milliamperes, or more o 7 Mc., to only a milliampere or two on 28 M This is normal.

The operation of the second 6C4 as a cryst oscillator may also be checked at this time. Plu a 7-Mc. crystal into the crystal socket and tur *Sw1* to "Crystal." Excitation to the 2E26 shoul be approximately the same as with v.f.o. contro It may be necessary to readjust the slug in *L3* trifle in order for the crystal to "start" promptl each time, but it will then require no addition adjustment for either crystal or v.f.o.

A 25-watt, 117-volt light bulb is convenient i tuning up the 2E26 stage. Connect it across th antenna terminal *J2*, plug the appropriate coil int the *L5* socket, and reconnect the B+ lead to th 2E26 stage. Set *C17* to maximum capacity, tur *Sw5* to "Transmit," and resonate the output stag by turning *C16* for the dip in 2E26 plate current At this point, the 117-volt bulb may glow.

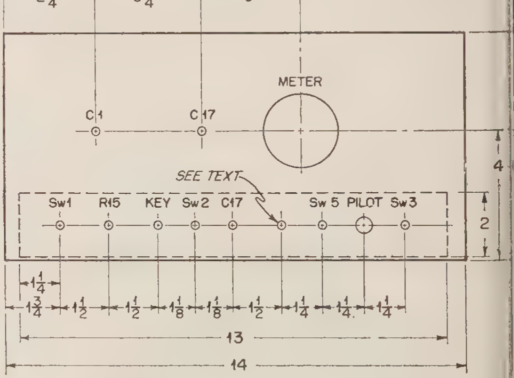

**Fig. 3. Drilling template for panel and front of chassis of the "Complete 25-er." Exact positions of controls and diameters of the holes will depend on components used.**

Decrease the capacity of *C17*, which will in crease the 2E26 plate current, in small steps, "dip ping" *C16* after each adjustment of *C17*. Continu this process until the 2E26 plate current is abou 70 milliamperes. Under these conditions, transmitter input will be about 25 watts and output will b between 15 and 18 watts.

Phone adjustments are simple. After plugging i the audio tubes and connecting the micropho turn *Sw4* to "Phone" and advance the audio gai control until normal talking produces 100 per cen modulation. Quality may be checked with the a

*(Continued on next page)*

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*(from preceding page)*

a simple diode monitor or the station receiver.
Switching from "CW" to "Phone" puts an added
d on the power supply. This causes the plate
ltage and the 2E26 plate current to drop some-
at—reducing input to about 20 watts on phone
mpared to 25 watts on CW. Coupling can be re-
justed for a full 25 watts input on phone, but
increase in signal strength is negligible.

If available, a calibrated grid-dip oscillator is
ry helpful in getting all coils on the proper fre-
encies.

Panel lettering was done with standard transmit-
decal set.

## Q-Multiplier

*(from page 16)*

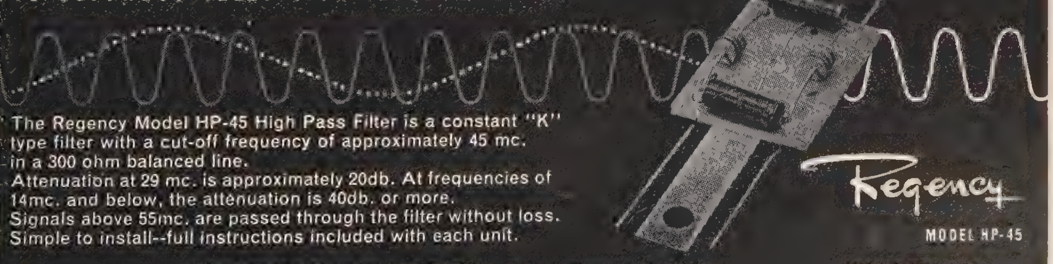
The *Null* position is now ready for use, and un-
s the receiver's plate supply potential varies
siderably, *R8* should require no further resetting except for occasional checks over long periods of time. When unstable plate power conditions exist, voltage regulation should be used for the maintainance of the best nulls without readjustment of *R8*.

With the selector switch now set at *Off*, tune in a pair of c-w signals which are close enough to each other to be heard at the same time. Then turn the switch to *Null*, and with *C3* it should be possible to tune out either of the two signals without materially affecting the remaining one.

Next tune in an a-m phone signal with the switch at *Off*. Then switch to *Null*, and set *C3* at the center frequency where the carrier will now drop out, leaving only the two sidebands. The effect to the ear will be one of a-f distortion, because the null is very sharp and the sideband spectrum is broad by comparison, the nulling notch in one of the sidebanks will not be noticeable by ear. The most useful function of the *Null* position will be that of tuning out a heterodyne beat note. This will occur at two different settings of *C3*, one will be at the point where the carrier is nulled, the other will be the point where the interfering signal is nulled. The latter is obviously the correct point.

*(Continued on page 64)*

HERE IS AN EFFECTIVE HIGH PASS FILTER TO SUPPRESS TELEVISION INTERFERENCE!



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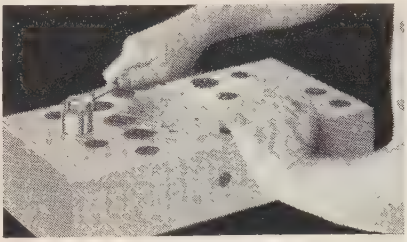

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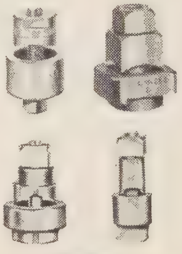

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SUPEREX ELECTRONICS CORP., YONKERS, N. Y.

*(from page 63)*

It should be noted that when the *Null* position is used, the normal selectivity characteristics of the i-f amplifier are not altered, except for the notch created by the *Q Multiplier Null.*

When the receiver is used in a normal manner for SSB reception, the *Null* position may most effectively be used to tune out a beat note and QRM in much the same way as with c.w.

## B-F-O Position

When the selector switch is set to *B.F.O.*, the unit will function as a beat-frequency oscillator for the reception of CW or SSB signals. The beat frequency may be tuned with *C3*, and the oscillator level may be adjusted by the selectivity control which will increase the level as the control is rotated towards minimum resistance. The size of the de-coupling resistor *R1* will also control the injection level. The value of *R1*, used in the model was found satisfactory for most reecivers, but some experimenting with its size may be required.

When the *Selectivity* control is set just above the point of oscillation, the b.f.o. level will be about right for c-w reception. For SSB reception, the selectivity control may be advanced further into the oscillating region where the b-f-o level will increase for exalted carrier use. If the a.v.c. is on, the increased b-f-o level will clamp it down and overloading of the receiver will not occur. The r-f gain control may be left turned up and the a-f gain control will have to be turned up higher than normal. The overall result will be cleaner SSB reception than would otherwise be realized.

If a-c hum is experienced when the b.f.o. is used, the r-c filter *R9/C8* should be used. This filter will be required also where erratic operation, uncontrollable squawking or motorboating may be encountered when using any of the other *Q Multiplier* positions.

## Additional Notes

Only one of the *Q Multiplier* functions can be used at a time, so it may be found best to combine one of these functions with some of the selective functions of the receiver. Such an arrangement may use a crystal filter for peaking selectivity while using the *Q Multiplier Null* for any notching additional to that obtainable with the crystal phasing control. Another situation may call for use of the crystal filter together with an exalted carrier furnished by the *Q Multiplier* unit. Combinations with other types of filters may be used, or two *Q Multipliers* may be used at the same time for various separate functions.

The frequency range of the models shown here is 450 to 500 kc. At the time of this writing, suitable and easily procurable components for the 262-kc. range have not yet been located. It is hoped that they may shortly be found.

*(Continued on page 66)*

# BACK ISSUES

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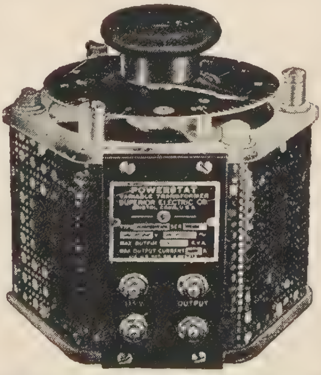

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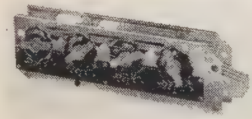

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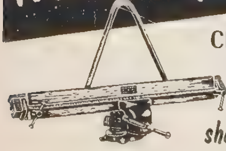

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*(from page 64)*

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Grateful acknowledgment is made to Stuart Weeks, W4HB, for his time spent in conducting operational tests using the *Q Multiplier.*

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## DX News

*(from page 34)*

### Here And There

Jerry, W0EJM, now keys from Silver Spring, Md. as **W3EJM.** . . . W1RTF, Bill, is now **K2JUI** in Liverpool, N.Y. . . . KZ5WR now runs **K4AMG** in Pensacola, Fla. . . . **KL7FAF** may be heard, mostly on weekends, on 14080 with Dick, W3PZW at the throttle. . . . **W6MUR** handles QSL's for VR3A for contacts made in ARRL and I.D.C. contests. . . . **HK0AI** makes QSL's by hand. Can anyone help him out with a batch? QTH is Victor Abraham, San Andres Island, via Colombia. . . . **W1JDE** is ex-TG9FG. If any QSL's are missing for his Guatemala contacts drop him a line. . . . Hurricane Hazel fixed beams of **K2EDL, W3BES, W2SAI** and **W3CTJ,** but good!!

**W4WYI/MM** is sparks on the S.S. MARINE SHIPPER. **W3WVF/MM** is the skipper. . . . **KZ5IL,** ex-KW6AR, now keys from **W4IKC.** . . . Put a ring around your calendar for January 15/16. That will mark the dates of the North/South Calif. Fresno get-together. . . . Jim, **HS1D,** will QRT on January 15 and will leave for the Eglin AFB in Florida on February 3rd. . . . G6UT may now be heard as **ZS1RG.** . . . Allan, **G3IDG,** bemoans the lack of CW on 28 Mc. He hears LU's, PY's, ZS's, CX and OQ5 all on phone but nary a peep of CW. Hang on Allan, 28 will be jumping pretty soon. . . . Bill, **W2SKE,** worked the phone contest from W2HJR's QTH thus taking advantage of Buz's five element beams on 14 and 21 not to mention a full sized 7-Mc. 3-element array on a 125-foot tower and 1225-foot V beam. Bill says magnetic disturbances during the phone section cut at least 33% off his possible score. . . . After holding W2WC for 25 years, Frank has moved to Conn. and now holds **W1WY.** Strangely enough he was closely associated with W2WY in the late 1920's. . . . Joe, W6GMF, shipped 300 QSL's to **ZM6AL** in November. You should be receiving them soon. . . . KV4BB and KV4AA received hand-made QSL's from **VQ6LQ.** Looks like he will come through OK.

### PAKISTAN DISTRICTS

(Via G2YS)

*AP2——Sind*
*AP3——Baluchistan*
*AP4——Northwest frontier*
*AP5——Punjab*
*AP6——Bhagalpur*
*AP7——Assam*
*AP8——Bengal*

## The Strapset

*(from page 24)*

and lockwasher. The base of the loading coil (½-inch diameter polystyrene rod) has a brass insert consisting of the top nut from an *Auto-Lite* spark plug which has the same thread and allows the antenna to be removed for storage. This nut is forced into a ¼-inch hole in the polystyrene rod with a hot soldering iron and becomes firmly welded in place when cool. The antenna rod itself is 26 inches of fairly stiff piano wire, heated and forced into the top end of the rod, and soldered to the end of the loading coil. A small loop is formed at the top end of the piano wire to eliminate the sharp point.

There is nothing critical about the wiring of the unit. The receiver works very smoothly and the regeneration setting is non-critical. The operation of the crystal is checked by using a grid-dip meter tuned to about 25 megacycles and adjusting the condenser across *L1* until output is indicated. This condenser is mounted on the rear side of the chassis below the final condensers and is reached through a hole in the case. To check for true crystal control, the crystal should plop out of oscillation very sharply as the condenser is tuned for maximum output. A point should be selected where the crystal starts up readily whenever voltage is applied. With the antenna connected, the final is tuned for maximum output using a field strength meter. Loading coil spacing is adjusted for maximum output befor gluing the turns in place with *Duco* cement.

The plate current when receiving is about 1 ma. and the filament current 110 ma. at 3 volts. When transmitting, the plate current is about 18 ma. and the filament current 230 ma. The filament current will vary slightly with modulation since the carbon microphone is energized from the filament battery.

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**NOTE:** The products and services advertised in this section are not guaranteed by the publishers of CQ.

## For Sale:

FOR SALE: Collins—75A2 $300; 32V2 $500; Gonset Communicator #1 $150; Morrow 10-75 converter $15; Motorola police cruiser receiver $15; Eldico TR75-2 kit $35; RCA AUT 112A receiver & transmitter $25. PR. E. D. Flynn, 3118 N. Francisco Ave., Chicago 18, Illinois.

SELL: NC-100 XA, with speaker, $50. K2EXP, Stony Brook, New York.

BUY SURPLUS radio equipment from U.S. Government. List $1.00. Details 10¢. Ham Box 213, East Hartford, Connecticut.

SURPLUS—RG-8/U cable 100 ft. $5.95, 250 ft. $13.25, 500 ft. $25. New connectors: PL-259 and SO-239 5 for $2.00. New oil-filled condensers 600WVDC 2 µfd 69c 4 µfd 90c, 7 µfd 95c, dual 8 µfd $1.95; 1000 WVDC—1 µfd 69c, 2 µfd 90c, 4 µfd $1.59, 8 µfd $3.25. AN/APS-13 420 Mc. transceiver with 17 tubes $15.50. Postage extra. Request new bargain bulletin. Visit new store for thousands of unadvertised bargains. Wanted to purchase—surplus radio equipment. Navy synchros. Lectronic Research, 717 Arch Street, Philadelphia, Pa.

FOR SALE: LATE Hallicrafters S-76 $125. TV set suitable monitor $30. W4API, 1420 South Randolph, Arlington 4, Virginia.

SELL: Like new NC-125 receiver, $150. No time for radio. Also Heathkit 35-watt transmitter with crystals, coupler to load any antenna $35. L. E. Osborne, RR #1, Tell City, Indiana.

GOOD used PE-75, 2500 watt, 120 volt, single phase, 60 cycle AC $195. FOB, W5EDX, 645 East Woodlawn, San Antonio, Texas.

SELL: Collins 310B Exciter and Precision E200C AM signal generator. Both items like brand new. George Kravitz, W2OTR, 7919—20th Ave., Brooklyn, 14, New York.

BARGAINS: WITH NEW GUARANTEE: R9-er $14.95; Gonset Triband $27.50; S-72 $59.50; S-38C $35; S-40 $65; NC-57 $65; RME-45 $99; Lysco 600 $109; S27 $99; SX-43 $129; S-76 $149; SX-71 $169; SX-42 $189; HRO-50 $275; HT-17 $32.50; EX Shifter $39; Globe Trotter $49.50; Harvey Wells, Sr. $69; DeLuxe $89; Viking I $209.50; New SS-75 $189; HT-9 $159; Globe King $275; 32V-1 $395; 32V2 $475; 32V-3 $595. Free trial. Terms financed by Leo, W0GFQ. Write for catalog and best deals to World Radio Laboratories, 3415 West Broadway, Council Bluffs, Iowa.

FOR SALE: Collins 30K with 310 exciter completely TVI'd. Spare final tube and spare modulator tube. $1,000. FOB, Waco, Texas. W5KAU, 2323 North 39th Street.

FOR SALE—UTC Varitran model V-O $9; Ahertran Transtat voltage regulator $7; 4—1614's $1.00 each; 3—6B4G's $.75 each; "Aemco" automatic timer model 72 $5; UTC LS-60A $18; also some filament trans. and other items. E. Wolanin, 7 Eaton St., Nashua, New Hampshire.

SELL: Heath; AT-1, AC-1, VF-1, all 3 for $50. Gardner Tape machine with tapes and Signatone $35. 40-80 meter receiver $22; HQ-140-X $235. All in A1 condition. Write: Ed. Wietnik, c/o D. T. Watson School, Leetsdale, Pennsylvania.

GELOSO VFO units used in W6SAI article, October CQ now being imported at $35.00, tested and calibrated, without tubes. GILFER Associates, Box 239, Grand Central Station, New York 17, N.Y.

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NTED: ART-13, DY-12, CU-25, BC-610, BC-614, -939, BC-729, BC-348, BC-342, BC-312, ARC-1, ARC-3, N-7, RTA-1B, TCS, Teletype, keyboard perforators, hme equipment, BC-221, LM, TS test equipment, Tech- al manuals, Signal Corps catalogs, APR-4, APR-5. y parts for these sets. Cash or trade (will take any ateur or surplus equipment in trade) for new Johnson ing, Ranger, Barker & Williamson, Hallicrafters, nmarlund, National, Gonset, Elmac, Telrex, Central ctronics, Harvey Wells, etc. Time payments. Alltronics, 19, Boston 1, Mass. Richmond 2-0048.

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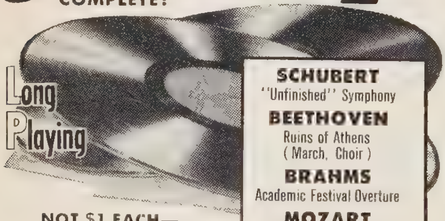

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BC-458 $7.50; BC-459 $12.50; BC-696 $20; Revere
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scope $30; Kay Mega-Sweep $225; Rider's TV manu
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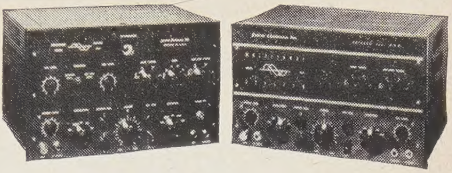

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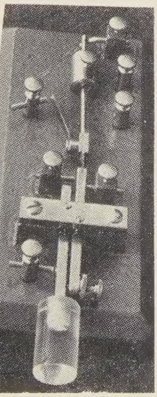

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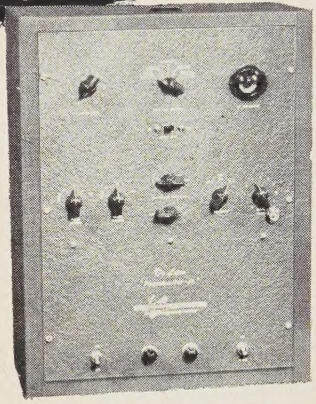

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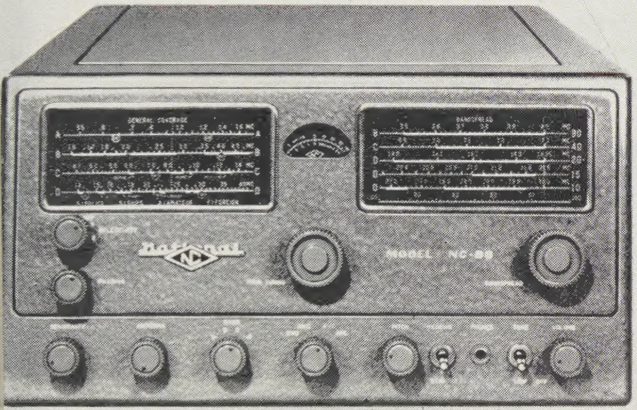

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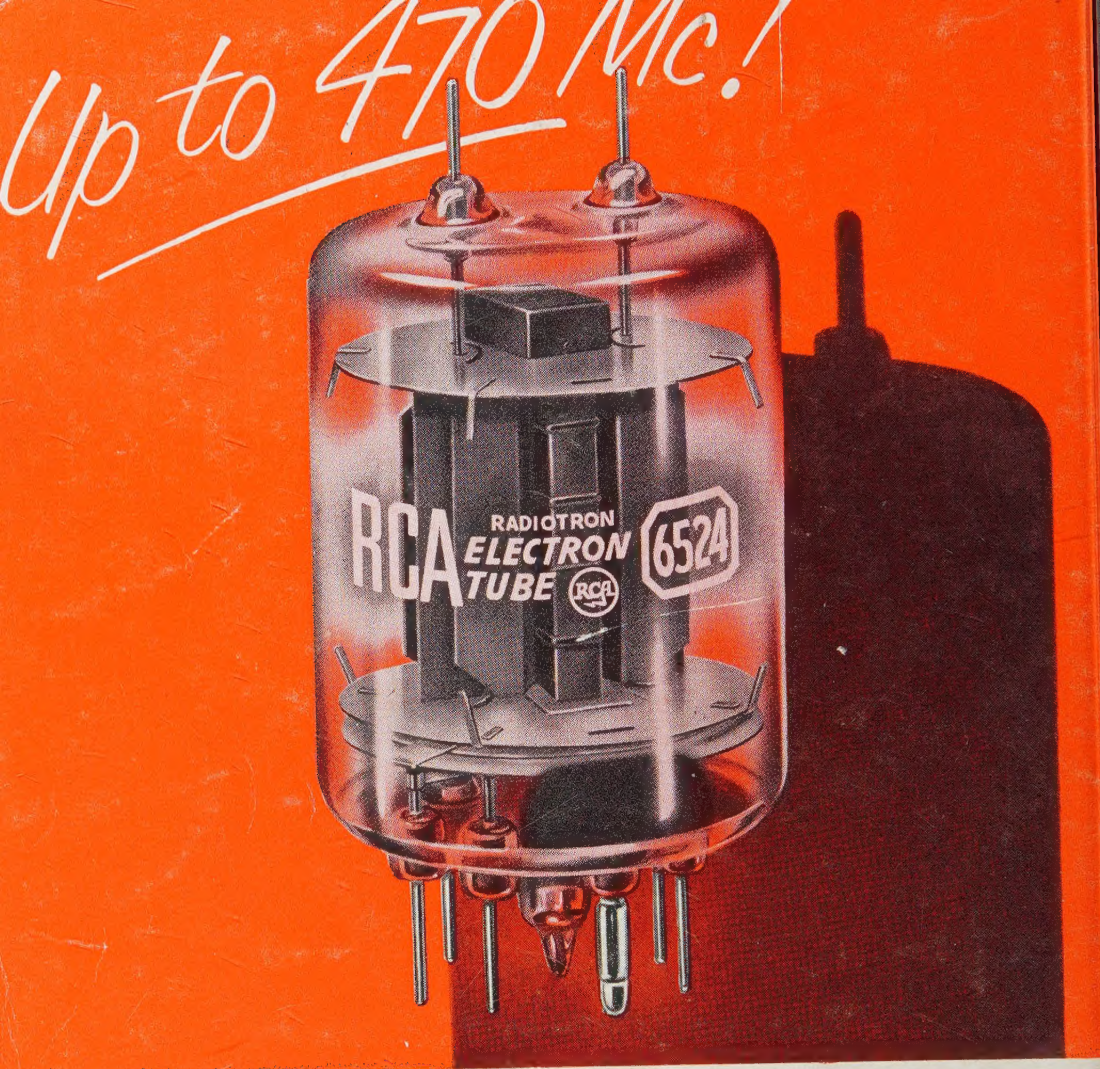

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